

Long Dispute Over Guarantees Settled at Nema Meeting

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Tricold Refrigerator Co., Buffalo, decided to make a speech. After 20 minutes of impassioned oratory, he proposed certain amendments to the code. Without such changes he foresaw various dire calamities. The amendments were passed but the mind of the meeting was elsewhere.

Mr. Potter, you will remember, is the fellow who ran a 20-page advertisement in the News to announce his new refrigerator for the 1932 season.

His \$5,000 check, paid in advance, ended the depression right there as far as the News was concerned, but several of the other manufacturers have never forgiven us for accepting that order which caused such a rum-pus among their distributor organizations. They said he wouldn't last six months. But there he was, a full-fledged member of Nema, and still razzing the big boys for their crimes and misdemeanors.

Excuse me for getting off the subject. As I was saying, everybody was waiting for the free service fight. E. G. Biechler and T. K. Quinn were there in person. General Motors and General Electric! Two heavyweight executives representing two of the largest corporations in the U. S. Two big-time merchandisers who disagree about everything. Two tough scrappers and both love a fight.

Well, they had it out while the others looked on and cheered. Howard Blood (Norge), Henry Burritt (Kelvinator), and others dealt a blow occasionally whenever they had a chance, but no one interfered seriously with the two-man contest. Chairman Johnston let them have the floor.

Time was called for a couple of intervals during which R. E. Imhoff (Westinghouse), with Messrs. Armstrong (Frigidaire), Burritt (Kelvinator), and Zimmerman (General Electric), attempted to draw up a statement which would clarify the issue. The final wording was agreed upon, however, by a series of give-and-takes between Quinn and Biechler.

The net result, on the surface, was a complete victory for Biechler. Step-by-step Quinn retreated. No more "four-year service plan." No more advertising of free service under any guise. If the cost of replacing defective sealed units is spread over all sales, then the amount charged to each customer for this purpose must be stated in the advertising. In no case is the purchaser to be led to believe that the replacement does not cost money.

Westinghouse Replacement Plan Favored by Other Manufacturers

The victory was not quite complete, however. The opponents of the G-E plan would have preferred to see the Westinghouse method adopted by all companies selling sealed units. Westinghouse charges the customer for replacement when the service is required. True, they do not charge the full cost. The fee is nominal and part of the total cost of service is added into the selling price. But they charge something, and that is better than nothing, according to the views of those who have to charge for all service.

The General Electric argument is that they do charge for all replacement service but that they collect the total cost by adding a small amount to the selling price of each machine. They must collect at the time of sale, they point out, because they cannot go back to the customers whose machines function perfectly and take up a collection to pay for one of a group which may go bad.

But now they agree to tell the customer that he is paying an insurance premium, or something of that kind, and they agree to tell the customer how much he is paying for that replacement service.

New "Insurance" Plan by G-E Is Indicated

Also the victory was not quite complete from another angle. Quinn gave up, but not until G-E had time to use the four-year service plan to its full advantage. Similarly, awhile back, he agreed to quit using the slogan "not one cent for service" but before doing so, he had gained his point by planting the idea firmly in the public mind.

So it may be that General Electric will soon be ready to spring a new sales idea anyway, and having about worn the old one threadbare, Quinn may have craftily permitted the opposition to win the hand. The possibility of a new approach which would get the idea over and still avoid the new rule was intimated in the discussion.

Biechler was quick to sense that possibility and hurled a defiant challenge: "Well, whatever it is," he said, "we will be right there with you."

Incidentally, the Quinn-Biechler match was probably, quite edifying to

the new members who have recently joined the Nema fold. It must have dispelled any vague suspicions that the Refrigeration Division might be under the control of a few big producers. It seems quite obvious that G-E and G. M. will have to get a new set of officers before there will be any collusion between those two companies.

As I said before, it was a lovely scrap and everybody had a fine time. So much so that they decided to meet again in Cleveland (Tuesday, Oct. 31). After the meeting General Electric provided a dinner, and Paul Dow rustled some local talent to entertain the visitors.

Executives of Gibson, Grigsby-Grunow, and Rudolph Wurlitzer companies failed to attend, but all other member companies were represented.

P. B. Zimmerman and G. J. Chapman of General Electric were there with T. K. Quinn. W. F. Armstrong, D. K. Banker, H. M. Williams, and H. W. Newell of Frigidaire were on

hand to back up E. G. Biechler. Perhaps Frigidaire's superior numbers (5 to 3) aided in the fight with G-E.

H. W. Burritt of Kelvinator, chided for inattention by the chairman early in the meeting, undertook to demonstrate his true interest in the proceedings and did most of the talking about fine points in the code until T. Irving Potter got warmed up. George W. Mason (Kelvinator) was in Cleveland but his time was taken up by the sessions of the Nema Board of Governors, of which he is a member.

Thomas Evans Elected to Executive Committee

Thomas Evans of Merchant & Evans, Philadelphia, who threatened to bust the Nema set-up wide open prior to the All-Industry Conference in Detroit last summer is now such a regular that he was elected to fill the vacancy on the Executive Committee of the Refrigeration Division. Other members are G. M. Johnston (Universal Cooler Corp.), chairman; George W. Mason (Kelvinator), W. F. Armstrong (Frigidaire), and Howard E. Blood (Norge). This Executive Committee will be the power that interprets the Refrigeration Code.

Howard E. Blood was appointed chairman of a Special Code Committee (other members: Thos. Evans and

W. F. Armstrong) which will handle the Refrigeration Code through the necessary procedure to get approval.

F. E. Sellman and C. M. Tanger represented Servel. Mr. Tanger and H. M. Williams (Frigidaire) were present as members of the Technical Committee. Mr. Williams, chairman, reported the committee's recommendations with reference to proposed changes in the American Standards Association Safety Code for Mechanical Refrigeration and concerning standard short and long methods of testing household refrigerators.

R. E. Imhoff and R. C. Cosgrove were present on behalf of Westinghouse. Mr. Imhoff functioned as a buffer in the free service fight since he was logically interested in seeing to it that each side got a square deal. Westinghouse makes a sealed machine, but is opposed to free replacement. The Westinghouse policy was frequently held up as a model, and every so often Imhoff was delegated to get the two sides together. After a few strenuous ante-room sessions he was ready to agree that being a popular model has its drawbacks.

Howard E. Blood and John Knapp represented Norge. They did not say much, although Blood made one wicked crack at the G-E guarantee policy during the melee. I cannot remember what it was, but it went over

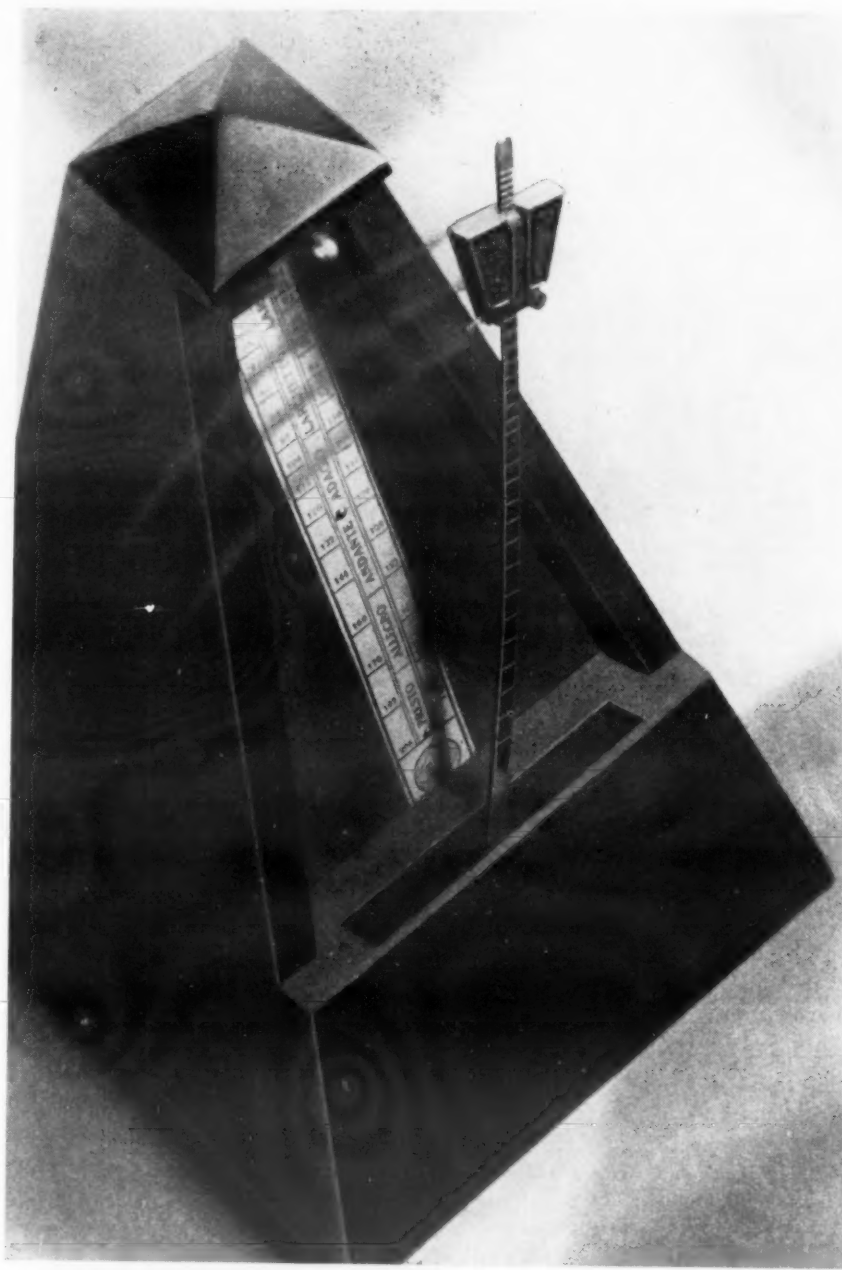
big with the crowd at the time.

Which reminds me to remark in fairness to Quinn that he not only had to contend with Biechler but he also had the whole crowd against him. Ever since the "Not One Cent" campaign, G-E has been playing the catcher's position at the Nema meetings. Before that Frigidaire was usually the target for industry criticism.

Lewis M. Crosley attended for Crosley Radio Corp., but took little part in the discussions. Considering the way Shelvadors and radios are selling Crosley isn't mad at anybody. Even the old Icy-Ball, the non-electric refrigerating outfit, is selling well in certain markets.

C. R. D'Olive of Stewart-Warner, who has won the respect of the Nema executives by his habit of logical analysis of complicated problems took a serious interest in all proceedings. According to reports, Stewart-Warner intends to take a more important position in the industry very soon.

H. J. Hunt of Trupar, C. A. Kuebler, and M. A. Martin of Uniflow Mfg. Co., T. Irving Potter and E. S. Russell of Tricold, and W. A. Carson of Sunbeam Electric Mfg. Co. were present. Louis Ruthenburg, consultant to the Nema Refrigeration Division assisted Chairman G. M. Johnston of Universal Cooler Corp. in conducting the meeting.



For 37 Years; IN TIME

In 1896 the JOURNAL first engaged in its fundamental business of keeping in time with New York. In 37 years, it has never lost a beat.

During that period, the tempo of life has changed many times . . . but the tempo of the Journal has always kept pace.

That is why, in 1933, the Journal is found to be exerting greater influence toward immediate BUYING OF HOUSEHOLD APPLIANCES by its 640,000 families than other newspapers which have been less responsive to the ever-changing pulse of New York's reading . . . and buying . . . habits.

NEW YORK JOURNAL

New York's BEST READ, and therefore,
most INFLUENTIAL evening paper

NATIONALLY REPRESENTED BY RODNEY E. BOONE ORGANIZATION

REFRIGERATION NEWS

Registered U. S. Patent Office

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Entered as second-class
matter Aug. 1, 1927THREE DOLLARS PER YEAR
TEN CENTS PER COPY115,000 ATTEND
APPLIANCE SHOW
IN PHILADELPHIACooperative Exhibition
Tops Refrigeration
Week Program

By George F. Taubeneck

PHILADELPHIA—Gar Wood and Guglielmo Marconi couldn't come to the Philadelphia Electrical exposition last week, but each of these internationally famous septagenarians contributed your-money's-worth thrills to the thousands of inhabitants of the City of Brotherly Love who mobbed into Convention Hall for the exposition.

At 40 cents a head, 115,000 persons clicked through the turnstiles to see the exhibition of electric refrigerators, radios, and other electrical appliances with which Philadelphia celebrated Electric Refrigeration Week.

General Electric, Frigidaire, Kelvinator, Norge, Majestic, Westinghouse, Crosley, Grunow, Mayflower, Electrolux, Leonard, Gibson, Apex, Graybar-Ilgold, Potter, and Sparton refrigerators were on display.

George Conover and his Electrical Association of Philadelphia set up the exhibits, sponsored the exposition, and managed the show.

Gar Wood contributed his Miss America X to the success of the exposition, and his world's championship speedboat practically stopped the show.

At any hour of the afternoon or night the 38-foot hull of the 7-ton hydroplane was so surrounded and hemmed in by admiring throngs that that particular corner of Convention Hall resembled a 1932 soup-line—except that these standers-in-line were better dressed.

Benefiting in a large way from the attention paid to the perennial Harmsworth Trophy winner was Peirce-Phelps, Inc., Philadelphia distributor of Gar Wood oil burners, Majestic refrigerators and radios, Thor washers, and Culinaire food preparers.

After looking over the aquatic speed marvel, visitors turned around to get acquainted with the modernistic new Majestic "Smart Set" radios and refrigerators.

Senator Marconi, the father of radio, opened the show Monday, Oct. 2, with the flourish of a "television pencil" in Chicago, where he was visiting A Century of Progress exhibition. Nearly 30,000 persons stood before the huge screen on which Marconi's televised message of greeting was flashed.

Utilizing one of the newest offshoots of the radio vacuum tube, the wireless inventor's handwriting was reproduced on the fluorescent screens of a

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SIDNEY MAHAN IS NEW
WESTINGHOUSE OFFICIAL

MANSFIELD, Ohio—Sidney D. Mahan has been appointed Westinghouse merchandise advertising manager with headquarters at the company's plant here, according to Ralph Leavenworth, general advertising manager of Westinghouse Electric & Mfg. Co.

Mr. Mahan comes to Westinghouse from Boston where he was vice president of the Greenleaf Co., advertising agency. Previously he had been vice president of the Fuller & Smith & Ross agency in Cleveland.

S. H. Pittman continues in the merchandise department as assistant advertising manager.

Pauley to Manage All
Majestic Service

CHICAGO—H. M. Pauley, formerly radio service manager, has been made general service manager of the Grigsby-Grunow Co. here.

In his new position, Mr. Pauley will have complete charge of both refrigeration and radio service, and will be assisted by A. H. Kessler, who continues as service manager of refrigeration, and R. H. Figard, who now occupies Mr. Pauley's former position.

Frigidaire Prices
Raised 10% on
Domestic Line

DAYTON—Prices on all Frigidaire household models were increased 10 per cent Oct. 9, according to officials of Frigidaire Corp. here. Following are all models of the line and their new f.o.b. factory prices (installation and federal tax included):

Standard 43, \$105; standard 63, \$153; SL-63, \$165; SL-73, \$213; super 43, \$167; super 63, \$211; super 73, \$248; super 93, \$284; super 123, \$348; and super 153, \$437.

OAKLEY TO ADDRESS
DETROIT ENGINEERS

DETROIT—A. W. Oakley, president of the American Society of Refrigerating Engineers, D. L. Fiske, national secretary of the society, and Louis Ruthenburg, consultant to the Refrigeration Division of the National Electrical Manufacturers Association, will address the next meeting of the Detroit A.S.R.E. Monday night, Oct. 16.

Mr. Oakley, who is connected with the Merchants Refrigerating Co. of New York City, will discuss modern cold storage practices.

Mr. Fiske will tell about A.S.R.E. activities and new plans for the society, while Mr. Ruthenburg will talk on "Some Practical Implications of the NRA," a subject with which he is familiar through his work in helping to formulate the Nema code for the refrigeration industry.

The meeting will start promptly at 8 p. m., in the fourth floor ballroom of the Book-Cadillac hotel.

REFRIGERATING MACHINE
GROUP'S HOURS APPROVED

WASHINGTON, D. C.—The National Recovery Administration on Sept. 30 agreed to a substitution of hours of labor proposed by the Refrigerating Machinery Association for the refrigerating machinery industry to take the place of hours stipulated in the President's Reemployment Agreement.

The provisions for hours of work as agreed to by the administration are as follows:

"Employees (other than factory or mechanical workers, or artisans and watchmen) shall not be employed for more than 40 hours per week. Watchmen shall not be employed in excess of the average number of hours such employees were employed during the first six months of 1933.

"Factory or mechanical workers, or artisans (other than outside erectors, electricians, engineers, firemen, and repair and maintenance crews) shall not be employed for more than 35 hours per week, nor more than 8 hours in any one day. Outside erectors shall not be employed for more than 40 hours per week, nor more than 8 hours in any one day."

WINNING DISTRIBUTORS
IN DERBY ARE ANNOUNCED

DETROIT—Final standings in Kelvinator's 1933 Derby sales contest were announced late last week by Vance C. Woodcox, director of advertising and sales promotion.

Sales during the period of the contest were 265 per cent of the quota established for the contest, according to Mr. Woodcox.

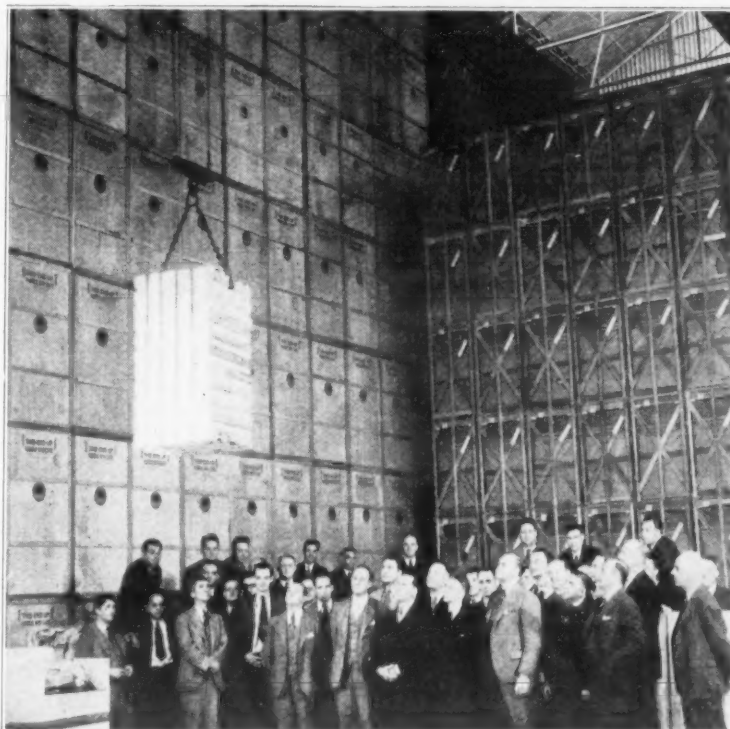
On a number of the 10 "tracks" into which the country was divided for the derby the race was so close that in many instances a scant 2 per cent of quota was all that separated fourth and fifth place distributors from the three who were "in the money." In order to give recognition in such cases additional cash awards were established to be awarded as special track prizes.

Following are the winning distributors on each of the 10 tracks:

Pimlico—C. R. Rogers Co. of Pittsburgh, first; Raymond Rosen Co. of Philadelphia, and E. A. Wildermuth Co. of Brooklyn, tied for second. Special track awards to Public Service Electric & Gas Co. of Newark and Kelvinator Sales Corp. of Buffalo.

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In Westinghouse's Big House



Westinghouse distributors and field men watch a crane making nine-high stacks of refrigerators in the mammoth new warehouse at Mansfield plant.

SOUTHWEST VIKINGS
VISIT CHICAGO FAIR

By George F. Taubeneck

MUSKEGON, Mich., Oct. 10.—Those hardy Vikings from the North who sailed out of icy fastnesses with Eric the Red and Leif the Lucky may have discovered America, but it took a new race of Vikings from the Southwest to discover Chicago. And Muskegon.

Arriving here yesterday to visit the Norge refrigerator factory, these new Vikings—leading retail salesmen of Norge products—admitted freely to any and all who would listen that if there was anyplace interesting in Chicago they missed last week-end, they would have had no business being there anyway.

From southwestern distributorships they came, these prize-winning Norge salesmen, with all expenses paid, to see Chicago, to see the Fair, and to see how Norge refrigerators are built. Most of them were men in their early thirties.

Among them, however, was one young woman—Mrs. Sue Middleton of

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Motors & Controls

Featured in this issue of ELECTRIC REFRIGERATION NEWS are several interesting technical articles on important phases of refrigeration motors and controls, and a compilation of specifications on leading makes of this equipment. For your convenience in referring to these articles, the following list of articles is presented:

"Motor Protection Needed for Certain Conditions in Refrigeration Systems," by E. B. Bremer (Westinghouse), page 7.

"Three Types of Motors Furnished by Delco," with speed-torque curves, by R. O. Yost (Delco), page 7.

"Oscillograph Used to Study Arcing of Control's Contacts," by L. M. Persons (Penn Electric Switch), page 8.

"Test Instruments Help Service Men in Control Work," by A. F. Rucks (Tagliabue), page 8.

"Characteristics of Capacitor Motor Well Suited to Refrigeration," by G. E. Cassidy (General Electric), page 9.

"G-E's New Control Has Spring Return on Defrost Switch," by E. S. Bush (General Electric), page 10.

"Effective Temperature Control Operates Air-Conditioning Equipment within Comfort Zone," by L. B. Miller (Minneapolis-Honeywell), page 11.

Specifications of Refrigeration Controls—page 12.

Specifications of Electric Refrigeration Motors—page 13.

"How Specialists in Motor Service Repair Refrigeration Motors," by G. C. Tatem (Electric Refrigeration Motor Co.), page 16.

G-E Will Entertain
Department Store
Men Oct. 17

CLEVELAND—One hundred department store executives from various parts of the country are being invited by General Electric Co. to attend a merchandising conference Oct. 17 and 18 at the company's specialty appliance sales department headquarters in Nela Park here.

Announced purpose of the conference is that it shall be a "merchandising clinic to discuss ways and means for department stores to merchandise all lines of electrical appliances more profitably."

Nineteen subjects will be discussed by conference speakers, among them being the following: department stores as a factor in electrical appliance sales; selection, supervision, training, and compensation of personnel; number of lines to be carried; advisability of private brands; proper price lining; application of NRA retail code.

GEORGE KNOLL DESCRIBES
REFRIGERANT GAS MASKS

CHICAGO—Increasing use of refrigeration gases in industrial plants and in our homes, and what to do for protection against this possible health hazard, was described last Thursday morning before the Refrigeration Section of the Annual Safety Congress at the Stevens hotel by George A. Knoll of the Mine Safety Appliances Co. of Chicago.

The development of mechanical refrigeration, air conditioning of homes, theaters, office and other buildings," said Mr. Knoll, "has greatly enlarged the field of refrigeration service. This is undoubtedly the beginning of an extension and development program which will in the not far distant future open up larger and more extensive fields for the industry."

Mr. Knoll outlined the percentages of different refrigerant gases in the air which are injurious to health, and described methods of testing for harmful amounts of gas in the atmosphere and methods of protection against these gases.

Strawn Takes Position
With Distributor

DETROIT—C. W. Strawn, formerly manager of the refrigeration division of Stewart-Warner Corp. in Chicago, has been appointed head of the electrical appliance department of Buhl Sons Co., Leonard distributor here, according to L. H. McLoskey of the Buhl organization.

MAJESTIC RAISES
PRICES ON ALL
MODELS OCT. 15Plant Will Resume
Production Next
Week

CHICAGO—Effective Oct. 15, prices will be increased on all models of the Majestic household refrigerator line, according to Harry Alter, assistant general sales manager of the Grigsby-Grunow Co. here.

Refrigerator plant of the Grigsby-Grunow factory was closed early in September, at which time company officials estimated that sufficient stock had been made to last through the remainder of this year.

With this inventory now practically exhausted, preparations are being made to resume refrigerator manufacture Oct. 15, and increased cost of materials and labor will necessitate the price raises on all refrigerators, Mr. Alter states.

Following are models of the Majestic line and their new list prices:

Model 400, \$106.50; model 450, \$121.50; model 500, \$149.50; model 700, \$189.50; model 900, \$230; and model 950 (all porcelain), \$247.50. First two models have conventional units, the rest hermetically sealed units.

RMA NAMES 2 NEMA
CODE SUPERVISORS

NEW YORK CITY—Supervision of the radio industry under the code of the National Electrical Manufacturers Association governing the electrical industry will rest with a supervisory agency which has been nominated by the Radio Manufacturers Association, according to an agreement reached at a recent meeting of the RMA here.

The RMA had previously decided, by a resolution of its board of directors, to operate under the Nema code, but maintaining the "identity and independent action of the radio industry."

The tube manufacturers division of the RMA has decided to form a radio tube section in Nema and have a separate code supervisor appointed for the tube industry. But all other RMA divisions have decided not to affiliate with Nema, although they will operate under its code.

Arthur T. Murray of Springfield, Mass., chairman of the RMA set division, and Leslie F. Muter of Chicago, treasurer and chairman of the association's parts, cabinet, and accessory division, were named as the code supervisors for the radio industry. Another code supervisor for tube manufacturing will be named later.

R. COOPER JR. APPOINTS
38 DISTRICT MANAGERS

CHICAGO—As a part of its program to double present sales personnel before launching an intensive selling drive, R. Cooper Jr., Inc., General Electric distributor here, has promoted 38 district representatives to the position of district manager.

Announcement of the promotions was made at a dinner meeting in the Atlantic hotel here recently, where P. B. Zimmerman, manager of General Electric Co.'s specialty appliance sales department, was principal speaker.

The new district managers, most of whom have been connected with the Cooper distributorship for five years, are as follows:

B. G. Kellogg, S. T. Wright, E. M. Brady, E. E. Noell, S. W. Doty, A. W. Jackson, C. B. Deeds, H. M. Geisman, J. F. Phillips, L. J. Baron, E. F. Heyden, B. A. Salava, I. H. Kaye, H. G. Finn, O. G. Nugent, R. L. Windman, G. E. Riley, W. H. Doerscher, H. S. Fullwood.

G. O. Hunt, A. G. Whitmer, W. H. Ericson, T. E. Smith, W. J. McGovern, F. J. Lubin, M. J. Wall, D. D. McMinn, A. C. Ahrendt, B. Weiser, L. G. Kohler, M. W. Ellen, J. F. Eme, L. B. Williams, W. E. Lionheart, R. N. Eischen, D. A. MacLennan, P. N. Scott, and H. Van Schaack.

BY GEORGE F. TAUBENECK ---

George Conover, Master Showman

Electric Refrigeration Week, Oct. 2-7, was celebrated all over the nation. Naturally we couldn't be everywhere at once, so we selected the city which we thought would put on the best show—Philadelphia. We weren't disappointed.

For some time the Electrical Association of Philadelphia has been considered one of the country's outstanding Electric Refrigeration Bureaus. Under the direction of President HORACE P. LIVERSIDGE (who is also vice president and general manager of the Philadelphia Electric Co.) and Managing Director GEORGE R. CONOVER, this organization has staged perhaps more fine cooperative activities than any city in the nation.

Nor was their electrical show last week any exception to this general rule of well executed cooperative endeavors. It was one of the best-attended and most effective (from the standpoint of leads and actual floor sales) exhibitions of electric refrigerators and companion appliances which we have ever attended.

People actually paid good money to get into this show! The writer (who considers himself a second One-Eyed Connolly and who never gets tired of boasting that he not only crashed the gate at the last Democratic national convention, but obtained a seat on the speakers' platform, to say nothing of worming through the police cordon at FRANKLIN D. ROOSEVELT'S inauguration) meekly paid his 40 cents at the window.

But everybody got his money's worth. GEORGE CONOVER is a master showman. There was something doing every minute, and George had his hand in most of the happenings, from presenting a beauty queen to leading the rip-snorting 50-piece orchestra himself.

By a coincidence, at the same time that the RCA-Victor Corp. was presenting its film entitled "His Master's Voice" at the electrical show, a new comedy entitled "Her Master's Voice" was playing at Philadelphia's Chestnut Street Opera House. Mr. Conover seized the opportunity to invite LAURA HOPE CREWS and ROLAND YOUNG, the stars of "Her Master's Voice," to be his guests at Convention Hall and view the similarly titled film.

While broadcasting a program of songs at the show, DOROTHY HALL was informed by telegram that her mother was dying in Wilmington, Del.

Following her performance, Miss Hall was provided with an escort to Camden and boarded a plane there for Wilmington. Her mother was being kept alive with the aid of oxygen tanks in the hope that her daughter would arrive in time.

Miss Hall announced that in any event she would return to the electric show to fulfill her contract. The show must go on.

Hundreds of Dealers

One of his best stunts was the gathering of Philadelphia's entire electrical appliance dealer body on the opening day of the exhibition for the First Annual All-Electrical Conference. (That phrase, "first annual," usually tickles our funnybone; but knowing GEORGE CONOVER'S strength of purpose and persistence, we'll wager that it does become an annual event.)

No clocker was placed at the turnstiles, but it was estimated that this conference was attended by some 1,400 serious-minded electrical men.

Among the speakers, in addition to Mr. Conover, were GEORGE E. WHITWELL, vice president in charge of sales of the Philadelphia Electric Co., LARRY DAVIS, managing director of the National Electrical Contractors Association, and L. W. MORROW, editor of *Electrical World*. Such extraordinary success in uniting Philadelphia distributors has been attained by the Philadelphia Electrical Association that it was decided something might be done toward harmonizing the vast spread of dealers in the metropolitan Philadelphia area. This meeting was the start.

Good Distributors

Ask almost any sales manager in the industry where his business is coming from, and he'll begin: "Well, we're shipping a flock of carloads into Philadelphia . . ."

Practically every manufacturer is inordinately proud of his Philadelphia distributor. He gets so many orders from that source that he just can't comprehend how any other distributor in that territory is doing any business at all. Usually refuses to believe, in fact, any stories you may tell him about how good a rival distributor in that city is.

But the fact remains that Philadelphia probably has more good refrigeration distributors per acre than any other city in the world.

Take J. J. POCOCK, the Frigidaire distributor, for instance. Operating five retail stores and working through some 200 dealers, Mr. Pocock has often been designated by Dayton officials as the No. 1 Frigidaire distributor.

Crisp, gray-haired, alert, brisk, Mr. Pocock is "all business." He sells a lot of refrigerators.

JUDSON C. BURNS, the G-E distributor, has been one of our favorite individuals for a long time. Few men in the industry are so universally beloved. His method is to follow the "long haul" theory; i. e., he picks his men carefully at the beginning, treats them well, and keeps them practically for life; the same applies to the merchandise he sells.

Not long ago he switched washing machine franchises, however, from Easy to General Electric. For years previously Philadelphia's best-known washing machine was the one which Mr. Burns sold under the comic name of "Burns-Easy."

Trilling & Montague sells ABC oil burners, Zenith and Emerson radios, L & H electric ranges, and Conover dishwashers. But this distributorship is best known as one of Norge's leading wholesalers. Almost any rival Philadelphia salesman will tell you that Norge provides some of his strongest competition.

Chief reason for Norge's continual stand-out-cy in Philadelphia is short-haired, short-spoken DAVE TRILLING, who has an idea a minute and who moves around so fast that few people can keep tabs on all the things he is doing.

Dave is now hot after the complete kitchen business, with his own Trillmont Electric Kitchen.

Peirce-Phelps, the Majestic distributorship which has recently acquired the Gar Wood oil burner franchise, is one of the best-known distributing houses in the entire Grigsby-Grunow organization.

TREV PEIRCE, is a true salesman, a big, handsome, amiable chap who inspires confidence and amity. His younger brother, JIM PEIRCE, who was for a time high in the official Majestic family at the factory in Chicago, is quiet and reserved, but fully as likeable as Trev. CHARLEY PHELPS, long well known and liked among the Philadelphia trade, completes the picture.

Kelvinator men like Salesmanager R. I. PETRIE are proud as the dickens of Distributor RAYMOND ROSEN. Distributor Rosen, in turn, thinks pretty highly of Kelvinator. He has recently become the RCA-Victor distributor in that territory.

Mr. Rosen is a fine-looking big fellow who radiates good cheer and heartiness. He insists that the refrigeration industry is exceptionally fortunate in having only one trade paper to read, instead of half a dozen or more as in the radio industry, and that the editor of *ELECTRIC REFRIGERATION NEWS* should have a 10-inch beard. Klein Stove Co. delivers Leonards in large numbers to Philadelphia citizens, and has consistently been among the leading Leonard distributors. HARRY KLEIN of that concern is a small, dark man who has little to say but behind whose forehead a lot of cogs are usually in constant and rapid motion.

Lewis & Carnell, the Crosley distributorship, is the recent successor to Lewis & Co., and consists of H. LEWIS, M. J. LEWIS, and STANLEY CARNELL. They have just gone through a reorganization and refinancing, but during that time lost scarcely a minute in the cultivation of prospects for Sheldors, Toridheet oil burners, and Newton Maid washers.

LOUIS BUEHN, the Gibson distributor, also handles Atwater Kent radios and Quiet May oil burners. His wholesale house is one of the oldest and most high grade in the state. Competition inclines to look upon the Buehn organization as a little high hat but eminently respectable and worthy.

Philadelphia Distributors, Inc., is a live young organization headed by HARRY ELLIS and A. E. HUGHES. Mayflower refrigerators, Grunow radios, Automatic Washers, and Kleen Heat oil burners are sold through this company.

Philadelphia Motor Accessories Co. (D. D. WEISS is the man) distributes Spartan refrigerators and radios, Mixmaster and Toastmaster, Hammond electric clocks, Samson electric appliances, and A. C. Gilbert toys. Mr. Weiss has a branch in Allentown, Pa., and operates from Trenton to Atlantic City, from Hazelton to Wilmington.

Westinghouse, Graybar, Servel Hermetic, Stewart-Warner, Apex, and

Hotpoint refrigerators are all sold in Philadelphia through factory branch operations. Philadelphia Gas Works Co. sells Electrolux. Dickel Distributing Co. handles Ice-O-Matic. Mack Machine Co. is the Universal distributor.

Schaffhauser-Kiley Corp., which has distributed Servel Hermetic and Grunow, has recently quit business. Grunow refrigerators are now sold through Motor Parts Co. which also handles Philco radios. Wilkening, Inc., sells Potter refrigerators.

This concern labels the Potter as "the Rolls Royce of refrigerators," and is doing an excellent job of selling this very high-priced line to a quality market in Philadelphia and its swanky suburbs.

Air Conditioning With Gas

J. A. WHITTINGTON of the Peoples Gas Light & Coke Co., Chicago, told the American Gas Association convention (see Oct. 4 issue) that air conditioning with gas is not making the progress which had been hoped:

"It is believed that this is largely due to the commercial end of our business not thoroughly convincing the manufacturing end that a real, worthwhile market for year 'round air conditioning with gas exists.

"This market can be opened up, providing that the necessary manufacturing expenditures are made to bring out neat combination summer and winter units to sell at reasonable prices. Fundamentally the units may be the same as existing ones.

"Manufacturers, however, hesitate to make these expenditures without proof that a definite market exists.

"Increased interest in winter air conditioning with gas and its acceptance during the past several years is well known. Winter units perform all air-conditioning requirements, except to cool and dehumidify the air, which is necessary in summer.

"The customer acceptance of these winter units is a most important prerequisite to the promotion of summer conditioning equipment.

"Each winter installation helps to educate the consumer in the comforts of clean, circulated air of proper humidity, and makes the addition of summer equipment much less expensive than in the case of buildings using radiation heating.

"The cleanliness, flexibility and freedom from attention, which are characteristic of gas fuel for heating, are doubly important as a source of energy for summer conditioning purposes.

"It is logical from the customer's standpoint and necessary from the gas company's standpoint that where this form of energy is already connected to the gas furnace, it should be used for summer cooling and dehumidifying, just as gas is logical for refrigeration in the kitchen as an adjunct to cooking.

"In other words, summer air conditioning should be looked upon as completing the year 'round cycle.

"Since summer and winter conditioning are so closely related, it would appear desirable to direct our efforts toward the installation of improved winter conditioning units wherever possible.

"In so doing, the possibilities in connection with these units for summer use should not be overlooked. Insulation should be considered part of every installation; also the circulating fan should be connected so that it may be conveniently used to bring in outside

air whenever desirable, in addition to providing circulation.

"Even with no refrigeration or air drying, many homes in the northern section of the country will be comfortable in summer if these things are provided.

"Two distinct lines of endeavor have been followed in the technical development of summer air conditioning with gas.

"One uses the principle of adsorption of moisture from the air by use of a solid or a liquid medium. In this system drying of the air is the principal operation in producing comfort; and cooling, if employed at all, is a secondary part.

"The other general type of system employs the steam-ejector principle, and water as a refrigerant. Such a system necessarily does cooling as a major operation. Any moisture removed from the air is secondary to this operation, and is brought about as a result of the drop in temperature.

"At least two companies are interested in the development of this type of apparatus, and both have made successful installations, but their major activity has been in connection with the use of street, or district steam.

"Both of these general classes of air-conditioning equipment produce satisfactory summer air condition, and both lend themselves to being constructed as an integral part of the complete summer and winter conditioner.

"However, the practice has been to connect these systems to existing warm air furnaces as a matter of economy in small quantity production.

"Both of these more advanced type units will operate satisfactorily and automatically and with little more attention than gas house heating furnaces require.

"Both have been made available to the industry, and although the price is temporarily high there are many house heating prospects which should be first approached with the idea of year 'round conditioning.

"The development of summer equipment has reached a point where it should be offered to the customer, and although price or some other consideration may make the sale of the summer equipment impossible at present, the idea of being able to add the summer equipment to the system at a later date will undoubtedly have its appeal.

"The record of the gas industry in summer air conditioning may seem somewhat meagre as compared with competitive means of air conditioning, as judged by the advertising and publicity of various kinds which are current.

"However, in connection with this it must be remembered that competitors are using equipment and principles of operation which were originally developed many years ago for purposes other than air conditioning, and whereas competitive systems have gained some headway because of these facts, they have not by any means perfected equipment for the applications which we are making an effort to reach: homes and other establishments in connection with gas heating to produce a year 'round air-conditioning service.

"Throughout the United States, the operating cost of gas summer air-conditioning equipment should, with few exceptions, be quite reasonable. The average well-built home will require a system of from 4 to 6 tons capacity.

"Data have been taken on a Silica-Gel adsorber and a steam ejector operating in the vicinity of New York, and it has been found that the cost per ton hour, using New York rates for this type of work, averages 7.9 cents per hour for the two installations.

"The rates are 60 cents per M cu. ft. for gas, 5 cents per kwh. for electricity and \$1 per M cu. ft. for water. Using

the method of operation employed in New York, the adsorption system is somewhat the cheaper of the two in operating cost.

"However, due to the different relative costs of the two forms of energy and water used, as well as to other methods of operation than those which were employed, this might be reversed.

"By using evaporative cooling in the systems which dry the air, the amount of gas required is increased and the water requirement is reduced.

"The only item of operating expense which can be considered at all uncertain is water. In most communities the actual cost of the water used is not great, but the possibilities of increases in cost, or of its use being forbidden due to scarcity, must be subject to serious consideration. This objection will be partly overcome eventually due to improvements in design."

Scaife, Strelinger, Hainsworth

Three of the fine figures of the industry, ART SCAIFE of General Electric, GODFREY STRELINGER of Kelvinator, and "DOC" HAINSWORTH of Electrolux have recently been honored.

News stories about Scaife's promotion to manager of the retail division of the General Electric specialty appliance sales department, of Strelinger's appointment as sales manager of Leonard, and of Hainsworth's receiving the Munroe award for gas industry achievement, have appeared on the front pages of the last two issues of *ELECTRIC REFRIGERATION NEWS*.

We should like to take this opportunity, nevertheless, to congratulate these men personally on this page.

ART SCAIFE, to our way of thinking, is one of the bright young men of the industry. For some time we have been predicting, and plugging for, his rise. Moreover, we think that this is just a starter for Art, and will be as surprised as we would be disappointed if he doesn't go much farther.

For the last five years he has been connected with the G-E refrigeration department's merchandising division, during which he has developed scads of sales helps, such as the famed Visualizer. He has had charge of sales slidefilms, has directed many sales meetings and conventions, and has conducted a good deal of field research. Previous to joining General Electric, and after his graduation from Ohio Wesleyan university, he gathered retail selling experience in many lines, worked for a time with an advertising agency, and was advertising manager for the Deming Pump Co.

A graduate of the University of Michigan, in the class of 1913, GODFREY STRELINGER since then has been actively engaged in the sales end of the automotive and electric refrigeration industries.

After a year with the Lozier Motor Co., he joined Dodge Brothers. From 1914 to 1917, he served the concern in various sales capacities, both in the home office and in the field.

During the war, he was a captain in the 328th Machine Gun Battalion.

From 1919 to 1921, inclusive, he was assistant sales manager of the Hayes Mfg. Co. of Detroit, maker of automotive sheet metal parts.

The next five years he spent with Chrysler Motor Corp. and its predecessor companies. During the last three years of this period, he was Chrysler's district manager for Michigan, Ohio, and Indiana.

In 1926, Mr. Strelinger organized the Strelinger-Copeland Co. of Detroit. This concern, for the next three years, distributed Copeland electric refrigerators in the Detroit area.

Joining Kelvinator in 1929, Mr. Strelinger took over supervision of all the corporation's branches. He handled this work for three years. He then became manager of the Kelvinator branch in Detroit, which position he held a year and a half, until his appointment as Leonard sales manager.

Dr. Hainsworth's versatility is shown by his records in mountain climbing during expeditions in the Canadian Rockies. Mountain climbing is one of his hobbies.

In August, a year ago with an exploring party, he made the first ascent of Mount Oublette near Jasper in the Province of Alberta, which was considered an outstanding feat in mountain-climbing circles.

The peculiar rock formation of Mount Oublette had defeated the efforts of some of the best climbers. In previous expeditions Dr. Hainsworth had conquered Mount Robson, the tallest peak in the Canadian Rockies. Dr. Hainsworth is a member of the Council of the American Alpine club, and also of the Explorers club.

Moreover, he was fullback on the football team of his Alma Mater, the University of Washington, at Seattle, from which he was graduated in 1896. He is a native of the state of Washington. And he's a great fellow. If you don't know him, you've missed one of the joys of goodfellowship.

DATA ON COST OF AIR CONDITIONING WITH GAS

	Chicago No. 2 House 1932	Chicago No. 1 House 1931	Chicago No. 1 House 1932	West- chester No. 1 Co., N. Y. House 1931	West- chester Co., N. Y. House 1932	Dallas House 1932	Baltimore House 1932
Conditioned Cubage	24,000	22,400	22,400	22,500	22,500	19,700	19,300
General Operating Data							
Total No. of Test Hrs.	61	338	111	328	46	300	48
Total Gas Used, Cu. Ft.	4,930	24,850	9,750	49,200	6,665	36,000	5,260
B.t.u.	(800)	(540)	(800)	(535)	(535)	(1,000)	(500)
Total Power Used, Kw. Hrs.	115	809	205.2	492	79	1,320	61
Total Water Used, Cu. Ft.	4,130	17,800	6,216	11,910	1,785	....	1,560
Total Operating Cost During Tests							
Gas Rate/M Cu. Ft.	\$0.64	\$ 0.78	\$ 0.64	\$ 0.60	\$ 0.60	\$ 0.65	\$0.62
Gas Cost	\$2.87	\$30.30	\$ 6.24	\$29.50	\$ 4.00	\$23.40	\$3.26
Power Rate/Kwh.	\$0.037	\$ 0.037	\$ 0.037	\$ 0.05	\$ 0.05	\$.022	\$0.0312
Power Cost	\$4.27	\$29.90	\$ 7.60	\$24.60	\$ 3.95	\$29.04	\$1.90
Water Rate/M Cu. Ft.	\$0.51	\$ 0.60	\$ 0.51	\$ 4.00	\$ 4.00	....	\$1.00
Water Cost	\$2.14	\$11.66	\$ 3.17	\$47.70	\$ 7.13	....	\$1.56
Total	\$9.26	\$71.86	\$17.01	\$106.45	\$15.08	\$52.44	\$6.72
Hourly Operating Quantities							
Gas, Cu. Ft./Hr.	73.5	118.6	88	150	145	120	110
Power, Kw.	1.89	2.39	1.85	1.5	1.72	4.4	1.27
Water, Cu. Ft./Hr.	68.7	52.7	56	36.4	39.6	0.0	32.5
Average Operating Cost/Hour							
Gas	\$0.047	\$0.0925	\$0.0661	\$0.0900	\$0.087	\$0.078	\$0.0682
Power	\$0.070	\$0.0885	\$0.0684	\$0.0750	\$0.086	\$0.094	\$0.0325
Water	\$0.035	\$0.0316	\$0.0285	\$0.1456	\$0.155	....	\$0.0396
Total	\$0.152	\$0.2126	\$0.1530	\$0.3106	\$0.328	\$0.173	\$0.1403



WHICH

refrigerator franchise is best for me?

before you decide, let us send you the
FRANCHISE COMPARISON CHART

Want to make money in refrigeration? Which refrigerator franchise gives you the most ideal selling conditions... fairest profit... most satisfied customers... most prestige? Which gives you the most complete line... with the most selling features... and the least service expense?

We're mighty sure it's Westinghouse. And to back up our convictions, we offer you the FRANCHISE COMPARISON CHART, with which *you*... in the privacy of your own office... can weigh

the merits of Westinghouse against any other refrigerator franchise. Compare them point for point... dollar for dollar. Add up the score, and then—let your own judgment take charge.

The Westinghouse FRANCHISE COMPARISON CHART is free... sent without obligation... and will take but a few minutes of your time to study. So send for it NOW, on the coupon below or your own letterhead. No matter what you are now selling, it will pay you to get the FACTS.



Westinghouse

Dual-automatic Refrigerators

Westinghouse Electric & Manufacturing Co.,
 Refrigeration Dept., (E.R.N. 10-11) Mansfield, Ohio

I want to check the facts. Send me the FRANCHISE COMPARISON CHART... free and without obligation.

Name.....
 Address.....
 City..... State.....

Marconi's Welcome & Wood's Boat Feature Philadelphia Show

(Concluded from Page 1, Column 1)
number of cathode-ray tubes in the show's auditorium.

Actually, Marconi was writing with a "pencil of electrons." This machine is called, by scientists, the cathode-ray tube for the transmission of intelligence either in printed or written forms, over wires or through the air.

The transmitting system consists of a pencil or stylus which is connected with two resistances, so that as the pencil is moved a voltage is picked off the resistances which is proportional to the movements of the pencil. The receiver consists of a standard cathode-ray tube with two pairs of deflection plates.

Applications of Pencil

This electronic pencil may be applied to communication between airplanes and ground stations, between vessels at sea not carrying a licensed operator and land stations, and also used for office intercommunications and communication between distant offices, between police department and radio equipped squad cars, for noiseless instructions to broadcasting artists, and for advertising purposes.

Radioed Senatore Marconi: "Deeply appreciate greeting and welcome from Philadelphia radio industry. Am delighted to learn you are opening Radio and Electrical exposition in your great city today. I marvel at progress made in development and enjoyment of radio in your wonderful country and extend my congratulations and best wishes to the radio men of Philadelphia for a highly successful exposition."

An electric "lie detector" was on

display. This ingenious invention by Major Raymond Phillips of London is operated by electrical "energy" through metal tubes. The electrical "exhaust" from the body registers thoughts and emotions on a dial.

G-E's Small Lamp

General Electric exhibited a lamp small enough to be tucked away in the hollow of one's tooth. This is the "grain-of-wheat" lamp, and is used in a delicate instrument called a "bronchoscope" by surgeons when extracting tacks and other foreign objects from the throats, lungs, and stomachs of those careless or unfortunate enough to swallow them.

In contrast with this pigmy lamp was shown the world's largest—one that is a million times larger in the amount of light it gives. This huge creation uses 50,000 watts of current and emits 150,000 candlepower.

Among other novel developments demonstrated were the radio knife, which cuts by electricity, and is being used extensively by surgeons; electronic musical instruments; and various applications of electric "eyes," or photo-electric cells.

Thousands crowded the RCA-Victor Corp. display to witness the first sound-on film home movie projector. There they saw a sound picture entitled, "His Master's Voice," depicting the history of home entertainment from the days of strolling minstrels down to the development of the modern talking machine of the present era.

Interest was evinced in the new fever machine which was developed by engineers of the General Electric Co. This machine is capable of inducing artificial fever in the human body to combat illness.

Another device shown was the oscillograph, a machine for photographing the human voice and orchestral music. It translates radio waves into light instead of sound, and projects them on a small screen.

50-Piece Orchestra

Entertainment was provided by a 50-piece orchestra under the direction of Jess Altmiller, crack drummer from the Philadelphia Symphony Orchestra. Mr. Altmiller and many of his musicians contributed solo performances each evening, and there was broadcasting directly from the stage by radio artists. Dr. Rollo Maitland, noted Philadelphia organist, played the giant console organ.

Wednesday was designated NRA Day, and Wednesday evening Miss Florence Weiner, who was the first selection for Miss Philadelphia in a recent beauty contest (but was disqualified when she got married), was crowned Miss NRA. Al White staged a pageant for this event. George Elliott and C. Rowe Stewart of the executive committee of the local NRA officially proclaimed blonde Miss Weiner the living symbol of the New Deal.

An exhibition of radio and electrical devices used by the Philadelphia Police Department in the suppression of crime was set up by the Electrical Bureau of the Department of Public Safety. Thousands of persons thus had their first opportunity of seeing actual police broadcasting and the means taken to communicate with the patrolling bandit cars and airplanes.

For women a cooking school was conducted by Ida M. Chitwood. Classes were held from Tuesday to Friday, starting at 2:30 p. m. and ending at 4.

The old and new methods of lighting and equipping stores, factories, and household kitchens were demonstrated by the Philadelphia Electric Co. with contrasting exhibits of the old "cross-roads store" and modern effects in a new store.

Distributors Finish Kelvinator Derby

(Concluded from Page 1, Column 2)
which firms were tied for fourth place.

Churchill Downs—Barber & Ross, Inc., Washington, D. C., first; Carolina Kelvinator Co., Inc., Greenville, N. C., second; Meachem Fenn Distributing Co., Syracuse, N. Y., third. Special track awards to Graybar Electric Co., Inc., and Kelvinator Sales Corp., Detroit branch, tied for fourth. Arlington Park—L. C. Wiswell Co., Inc., Chicago, first; Kelvinator-Rowlands Co., Toledo, second; Listenwaller & Gough, Inc., Los Angeles, third. Special track award to Albany Garage Co., Albany, N. Y.

Belmont—Earle Rogers Co., Wheeling, W. Va., first; Sherman Clay Co., San Francisco, Calif., second; Williams Distributing Co., Clarksburg, W. Va., third. Special track award to Virginia Public Service, Alexandria, Va.

Latonia—Devlin Drew Co., Fresno, Calif., first; Kelvinator-Bohman Co., Hagerstown, Md., second; 555, Inc., Little Rock, Ark., third. Special track award to Public Service Co. of Colorado, Denver, Colo.

Hawthorne—Zions Cooperative Mercantile Institute, Salt Lake City, Utah, first; Pixley Electric Supply Co., Columbus, Ohio, second; Tull & Gibbs, Inc., Spokane, Wash., third. Special track award to Kelvinator Coreva Co., York, Pa.

Laurel—Automobile Sales Co., Memphis, Tenn., first; Bangor Hydro Electric Co., Bangor, Me., second; Dayton Kelvinator Co., Dayton, third.

Bowie—Stambaugh Thompson Co., Youngstown, Ohio, first; Briggs-Hagenlocher, Erie, Pa., second; C. T. Patterson Co., Inc., third. Special track award to Interstate Electric Co., Inc., Shreveport, La.

Washington Park—Garlock-Kelvinator Co., Lansing, Mich., first; Jones Cornett Electric Co., Welch, W. Va., second; Wisconsin Valley Electric Co., Wausau, Wis., third. Special track award to South Carolina Power Co., Charleston, S. C.

Fairmont—Northern Indiana Refrigeration Co., South Bend, Ind., first; Florida Power Corp., St. Petersburg, Fla., second; Adam-Snyder & Co., Terre Haute, Ind., third. Special track award to Gulf Power Co., Pensacola, Fla.

Finishing first on the Agua Caliente (home service) track was Lilyan Alexander, home economist with Southern Public Utilities in Charlotte, N. C. Her prize was a blue and gold traveling clock.

Norma Niehoff of the main Kelvinator sales office in Buffalo; Odelle Stewart, Clark & Jones, Birmingham, Ala.; and Nell Brownlee, Southern Public Utilities in Spartanburg, S. C., came in second, third, and fourth, respectively.

A shark-grained leather traveling bag went to Miss Niehoff for her achievements in the derby, while Miss Stewart was sent an overnight case. Fourth prize, won by Miss Brownlee, was a breakfast set of ivory pottery with luster bands.

McLaughlin Appointed Temprite Engineer

DETROIT—H. B. McLaughlin, associated with Liquid Cooler Corp.'s Chicago branch since the beginning of this year, has been transferred to the engineering staff at the factory.

NORGE VIKINGS SEE CHICAGO--ALL OF IT

(Concluded from Page 1, Column 3)

Kansas City, the first and only feminine Norge seller to qualify for the Viking Club. She was immediately dubbed "the Viqueen."

John Knapp, vice president in charge of sales of Norge Corp., R. E. Densmore, western manager, and W. C. Rowles, southwestern divisional manager, had charge of the delegation. Mr. Knapp addressed the gathering in Muskegon Monday noon.

Last night a group of entertainers from Chicago, including danseuse Evelyn Hoffman, who is almost as much a Norge fixture as the Rollator, staged a hilarious show for the Vikings.

Early this morning the entire party returned by train to Chicago, from where the various members are scheduled to return to their homes.

Those in the party included:

Ellis Saville, Springfield, Ill.; L. F. Nerwin, Springfield, Ill.; E. L. Young, Springfield, Ill.; O. R. Hill, Quincy, Ill.; F. W. Beer, Decatur, Ill.; Nelson Foeheer, Springfield, Ill.; J. P. Murphy, Taylorville, Ill.; Bruce Kimball, Taylorville, Ill.

George Hollerman, E. Reden, Ben Lloyd, W. G. Gaston, F. A. Schmidt, Carl Lange, J. E. Grimes, C. C. Meyer, H. Birkenstock, W. J. Murphy, all of St. Louis.

H. C. Brown, Walter Moon, J. C. Grimm, and N. A. Bechard, St. Louis; W. J. Arbeiter, Murphysboro, Ill.; R. G. Parks, St. Louis; S. K. Gerhart, E. St. Louis, Ill.; P. A. Crow, St. Louis; F. J. Cowling, Mt. Carmel, Ill.; A. C. DeBell, Carbondale, Ill.

Gus Lawrence, Tyler, Tex.; Joe Suor, Kansas City, Kan.; Bill Tinsley, Kansas City, Mo.; A. P. Crook, St. Louis; Harry Bohr, St. Louis; George Kirchner, Nameoki, Ill.; Henry Stoehr and E. C. Wachter, E. St. Louis, Ill.; L. W. Pallister and Earl Stocker, Wood River, Ill.

V. E. Smith, Rollo, Mo.; J. W. Dent, Louisiana, Mo.; F. W. Stewart, Columbia, Mo.; Louis Naes, St. Louis; George Blanner, Webster Groves, Mo.; Louis Daly, Kirkwood, Mo.; L. N. Steinback, Louis Speilberg, and H. E. Cox, St. Louis; E. J. Eaton, Carbondale, Ill.; G. A. Weis, Cape Girardeau, Mo.

R. C. Craig, E. A. Sander, and Arnold Dick, St. Louis; R. A. Medcalf, Garthursville, Mo.; R. C. Haertling, Ste. Genevieve, Mo.; C. F. Mayle, Pacific, Mo.; Floyd Seyler, Centralia, Ill.; Roland Leamon, Obion, Ill.; L. M. Hildreth, Bridgeport, Ill.; R. E. Parks, Murphysboro, Ill.

L. M. Paul and Herman Weil, St. Louis; R. T. Sutton, Springfield, Ill.; A. I. Morrison, St. Louis; L. H. Walker, Poplar Bluff, Mo.; W. C. Maxwell, Pinckneyville, Ill.; E. L. Hese, Harrisburg, Ill.; Harold Hayden, Benton, Ill.

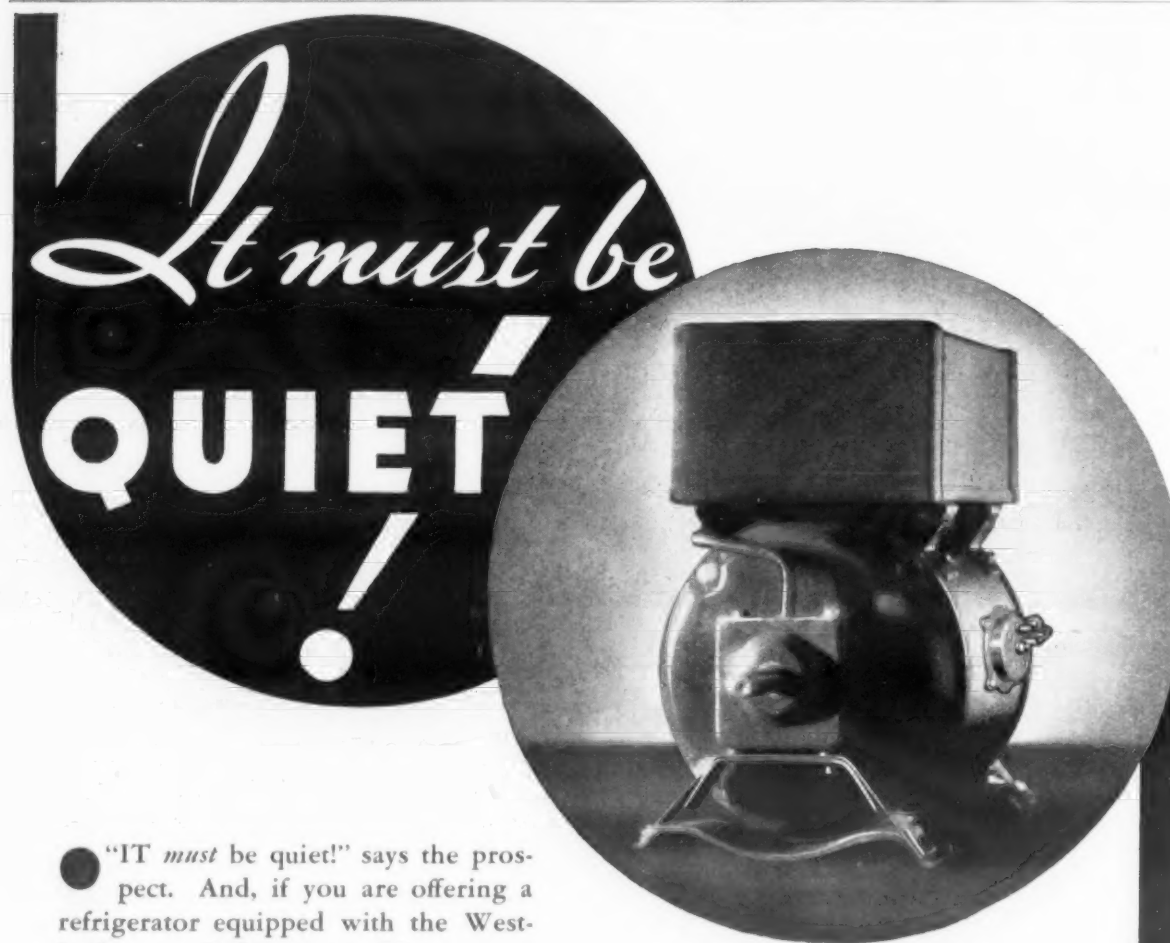
George Howard, Robert Dahlheimer, Norman Mortensen, J. D. Vinyard, and Victor Hass, St. Louis; Wm. Sundermeyer, Belleville, Ill.; H. S. Held, Alton, Ill.; J. H. Hoelting, St. Louis; J. A. Stewart and Clyde Stewart, Columbia, Mo.; L. E. Vogt, J. Dahlheimer, Walter Ashe, W. H. Walker, W. J. Lane, Jr., A. H. Bottenfield, and A. H. Crowe, St. Louis.

Miss Maxine Louk, G. W. Perry, E. H. Ross, G. O. Pippert, Frances Tucker, H. E. Whitehead, Wm. Cain, Mrs. Sue Middleton, T. H. Condon, Harry Moore, M. S. Tinsley, Miss Lorraine McKiddy, Miss Penelope Culley, J. W. Crockett, J. P. Bell, Buddy Nelson, and Lucille Mathony, Kansas City.

C. E. Binion, Monett, Mo.; K. B. Arbogast, Osawatomie, Kan.; Wallace Garvey, Wichita, Kan.; H. E. Kitzberger, St. Joseph, Mo.; Mrs. H. B. Kitzberger, St. Joseph, Mo.; E. W. Hille, Independence, Kan.; E. B. Winkelmeyer, Salisbury, Mo.; H. C. Edwards, Independence, Mo.

W. T. Fields, Lee's Summit, Mo.; Mr. & Mrs. P. E. Thurman, Anthony, Kan.; Mr. & Mrs. H. S. Beams, Lawrence, Kan.; Edgar Hunter, Galveston, Tex.; A. E. Drew, Goose Creek, Tex.; R. L. Darwood, Pt. Arthur, Tex.

Jack Gartman, Brady, Tex.; John McGee, Corsicana, Tex.; E. T. Hamer, Dallas; T. L. Ray, Jacksonville, Tex.; Guy Florence, Tyler, Tex.; C. I. Hyatt, Olden, Tex.; Edgar Davis, Brownwood, Tex.



● "It must be quiet!" says the prospect. And, if you are offering a refrigerator equipped with the Westinghouse Refrigerator Motor, you have an honest and positive answer . . . "It is quiet!"

Silence is assured by liberal design and a modern resilient mounting that absorbs the natural vibrations of the motor . . . a mounting that will remain effective throughout the life of the refrigerator, because its construction includes no rubber or other materials that might deteriorate. Also, this motor's special bearing construction eliminates end-play noises.

In addition, the motor can't "burn out" when thermoguard protection is specified—a thermostat guards against

all abnormal operating conditions, automatically shutting off the motor when danger threatens, and starting it again when the danger is past. It is not "expensive to operate," for its simple design and special oiling system afford a new degree of efficiency assuring minimum power consumption.

Remember! When a prospect wants a quiet, efficient, trouble-free refrigerator, you've something *real* to sell if your line is equipped with the Westinghouse Refrigerator Motor!

Westinghouse

Refrigerator Motors



DETAILED INFORMATION FREE

Westinghouse Electric & Manufacturing Company
Room 219—E. Springfield Works, Springfield, Mass.
Send us complete, detailed information on the Westinghouse Refrigerator Motor.

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Company
Position T 79742
Address ERN 10-11-33

When Special Coils Are Needed Here's Quick Service

Now Over 45,000 Larkin Coils in Daily Use

EVERY normal coil requirement can be supplied from our line of 125 Standard Models and Sizes all of which are stocked for quick delivery at Atlanta, Brooklyn and Chicago.

Occasionally an unusual installation requires a special size Coil. These coils are made to order only at our Atlanta factory. Our production facilities are geared to fast special order service.

STANDARD FACTORY EQUIPMENT WITH

COPELAND : SERVEL : WILLIAMS ICE-
O-MATIC : MAYFLOWER : UNIVERSAL :
KULAIR : ZEROZONE : M & E : MODERN :
STARR : MOHAWK : DICELER : LIBERTY :
H. M. Robins Co., Export and Others.

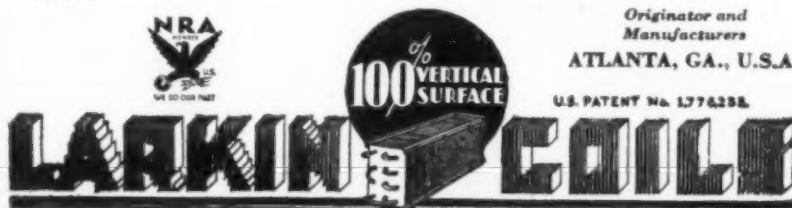
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Refrigerating Corporation

Originator and
Manufacturers

ATLANTA, GA., U.S.A.

U.S. PATENT No. 1,774,338



CODE FOR RETAILERS AWAITING APPROVAL

WASHINGTON, D. C., Oct. 9.—The retailers code of fair competition which will apply to dealers in everything except foods, tobacco, and milk was placed in the hands of Administrator Hugh Johnson Sept. 29, and was expected to be placed in the hands of President Roosevelt tomorrow (Tuesday) for final approval.

Most salient section of the retailing code is Article VIII, known as the stop-loss provisions. Briefly, this section of the code requires all retailers to charge at least 10 per cent more than the wholesale delivered price.

The code, however, allows certain exceptions to this rule. The retailer may sell below these prices at a bona fide clearance sale. He may cut prices on imperfect or damaged goods if he advertises them as such. He may dispose of discontinued lines. He may cut prices if he is about to go out of business and wants to cash in on his stock. He may offer special prices for buyers who want large quantities, provided these buyers are not to resell the goods to individuals.

BALTIMORE WHOLESALERS TO FORM ELECTRIC LEAGUE

BALTIMORE—To eliminate unfair merchandising methods and establish standards of good business practice, local associations of refrigeration and radio wholesalers are being formed here. When organization of the two groups is completed, they will be united as the Electric League of Baltimore.

Heading the refrigeration distributors' association is E. B. Dorsey, manager of the Baltimore Frigidaire branch. W. M. Bagby of the Bagby Co., Mayflower distributor, is secretary of the organization.

On the committee chosen to draft a code of fair practice for refrigeration wholesalers are Mr. Dorsey and the following:

Dorsey Hines, G-E distributor; Leroy Andrews, president of Columbia Wholesalers, Inc., Norge distributor; S. Gordon T. Parks, president of Parks & Hull, Inc., Westinghouse distributor; and Dorsey Smith, refrigeration manager of the Consolidated Gas, Electric Light, and Power Co., Kelvinator distributor.

Head of the new radio wholesalers' association is George Ollendorf, president of Ollendorf & Hirsch, Inc., distributor of RCA-Victor radios and Grunow refrigerators. Other officers are:

Calman J. Zamoiski, Majestic distributor, vice president; Leroy Andrews, Philco-Norge distributor, treasurer; and Edward W. Ament, manager of the Baltimore division of Southern Wholesalers, Inc., Zenith, American-Bosch, and Leonard distributor, secretary.

On the radio group's general practices committee are Messrs. Ollendorf, Zamoiski, Andrews, and C. A. McCubbin, manager of Baltimore's General Electric Supply Co.

C. H. Buchwald, president of Lincoln Sales, Inc., Crosley distributor, is chairman of the radio association's service committee. Also serving in this group are George Hull of Parks & Hull Automotive Corp., Atwater Kent distributor; E. W. Cowman, manager of the radio and refrigeration division of the Baltimore Gas Light Co., Stewart-Warner distributor; and E. P. Bauernschmidt, refrigeration and radio manager of J. R. Hunt & Co., Spanton distributor.

Plans are also under way for organization of a refrigeration retailers' association in Baltimore, and J. C. Griffith of the retail sales division of Frigidaire Sales Corp. has been appointed to direct organization proceedings.

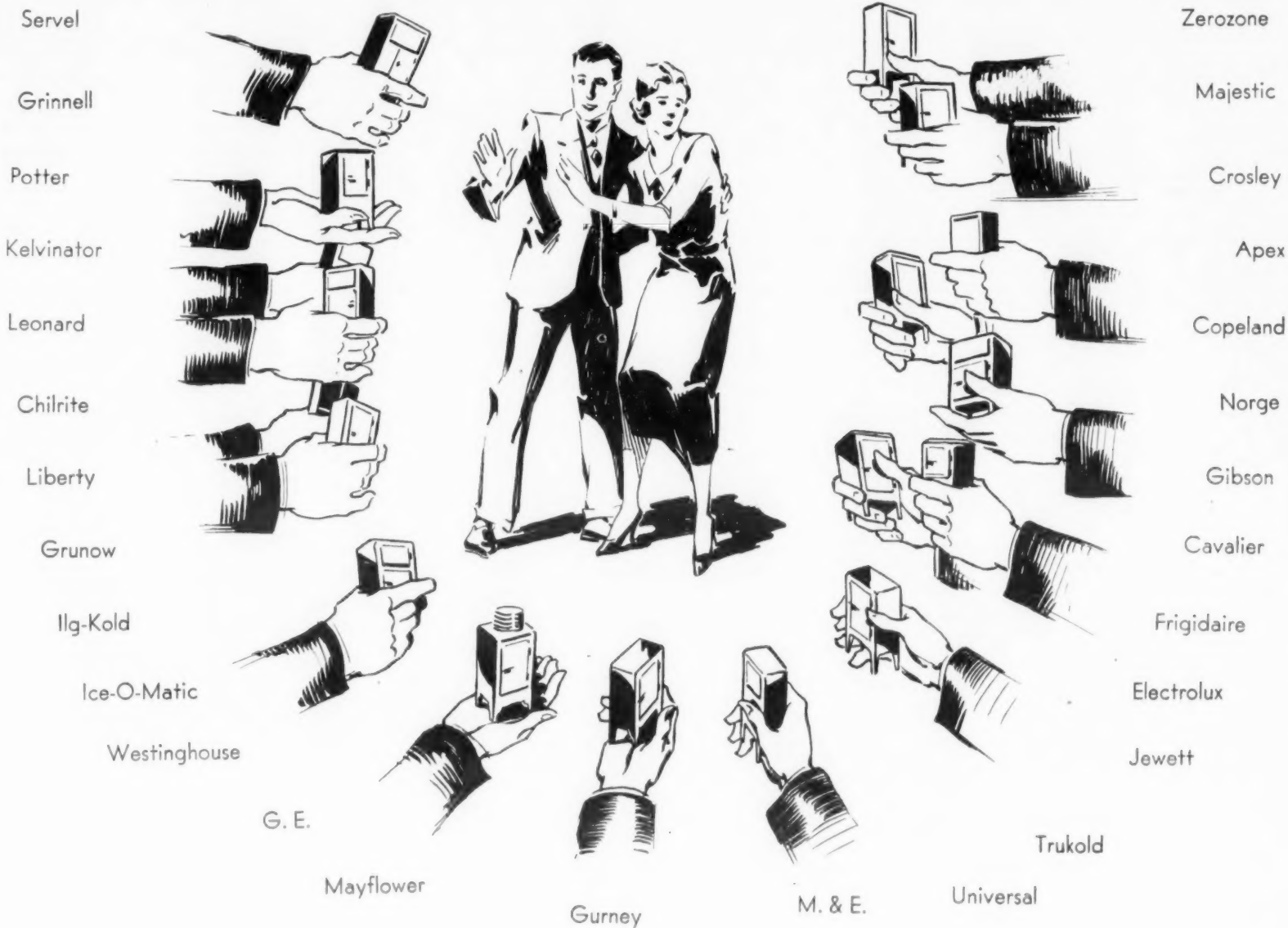
NORGE MAILING PIECE SENT FROM FAIR

DETROIT—By means of a new mailing piece prepared by Norge Corp.'s J. A. Sterling, advertising and sales promotion manager, Norge dealers visiting the Chicago Fair may continue their work with prospects even during the trip to the exposition.

The mailing piece is a post card bearing two pictures—one of the Norge exhibit at a Century of Progress, the other of the fair's Electrical Group. On the back is placed a message to the prospect, reproduced in the dealer's handwriting.

BUREAU PLANS CONTEST ON CHRISTMAS DISPLAYS

NEW YORK CITY—Electric refrigeration dealers who use special window and floor displays during the Christmas season and comply with contest rules of the Electric Refrigeration Bureau will be eligible for cash prizes to be awarded by the bureau to outlets in various classifications. Plans for the competition are incomplete at present.



"MINE'S BEST"

Pity the poor buyer. Scores of hands clutching at his wallet. A medley of voices shouting "Mine's best." A bewildering display of refrigerator pulchritude.

Some of these refrigerators are built to justify the salesman's cry, "Mine's best," but the majority are not—and what is the helpless buyer to do? He is given not a crumb of information about the *lasting performance* of a refrigerator. Only high pressure selling of names, gadgets, designs, prices.

In every stable consumer industry there are grades of quality. But only *one* grade has ever been known in the refrigerator industry. In reality there are fine, good, fair, poor and worse grades sold today in quantities—all with the assurance that they are the best.

Why not meet the growing demand for proof of quality with an answer that will *help* selling, not retard it . . . by the publication of impartial standard tests that will show the real worth of

every refrigerator in actual use—and over a period of years? Why not give the public tangible, usable information that will enable them intelligently to buy refrigerators to meet their specific requirements?

No refrigerator is any better than the parts and materials that go into its construction. And those must stand up *under actual conditions of use*. There are many points of possible failure in a refrigerator, but manufacturers and dealers whose refrigerators have been insulated with Dry-Zero know this for a certainty—they never will have any trouble from that source. Any refrigerator insulated with Dry-Zero will stand any kind of scientific test and show better results than with any other insulation. Dry-Zero assures economical operation for the life of the refrigerator.

We welcome an opportunity to submit proof to anyone in the industry. Dry-Zero Corporation, Merchandise Mart, Chicago, Illinois. Canadian Office: 687 Broadview, Toronto, Ontario.

THE MOST EFFICIENT
COMMERCIAL INSULANT KNOWN

DRY-ZERO

ELECTRIC REFRIGERATION NEWS

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The Newspaper
of the Industry



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EDITORIAL AIMS

To encourage the development of the art.
To promote ethical practices in the business.
To foster friendly relations throughout the industry.
To provide a clearing house for new methods and ideas.
To broadcast the technical, commercial, and personal news of the field.

VOL. 10, No. 6, SERIAL NO. 238, OCTOBER 11, 1933

Neglected Towns

JOHN KNAPP, mile-a-minute vice president in charge of sales of Norge Corp., thinks that one of the most pressing problems of the electric refrigeration industry is that of cultivating business in the thousands of towns and villages which have been neglected for so long.

Sometimes after Mr. Knapp returns from a trip—and Mr. Knapp's extensive traveling, incidentally, may be one of the reasons for renewed prosperity of railroad lines—he feels pretty good. He has visited a dozen distributors, say, and watched their operations. It seems to him that they have been squeezing just about all the business out of their various cities that might be expected. Their sales forces are adequate and alert; promotion is continuous and effective; business is good.

But as soon as he gets settled behind his desk and begins studying his distribution map, he begins to get despondent. There are so many neglected towns.

Like all other sales executives in this industry, Mr. Knapp finds the vast bulk of his refrigerator shipments going into a relatively few cities. Saturation points of those cities are rising steadily. Queries Mr. Knapp: "What of the future?"

Well taken, we feel, is the theory of Norge's chief sales executive that small towns offer a good—and sadly neglected—market for electric refrigerators. First of all, small towns are collections of home owners. The bird-like families which hop from place to place, staying nowhere very long at a time, are found chiefly in the metropoli. Small-town families stay put.

Moreover, homes mean something to small towners. Those fading old institutions, the home, the church, and the school, are still the hubs of small-town activities. Pride of ownership, especially as related to things for the kitchen and the parlor, is possibly more important in cities of limited population than anywhere else. All entertaining and most social life is there centered in the home, rather than tangential off into theaters, restaurants, clubs, and speakeasies as in the larger centers. An electric refrigerator to a small town (ask the man who owns one!) becomes a source of pride and a joy forever.

This same pride factor makes small town purchasers of electric refrigerators comparatively good credit risks. Once an article so important as an electric refrigerator is installed in a home of this sort, the owners are likely to sacrifice and even fight to keep it there. All the neighbors know it has been installed. In fact, the whole town does. The disgrace of having it removed for failure to meet time payments is keen in such instances.

Selling a specialty article to a small-town

market is not easy. That's perhaps the chief reason why distribution of electric refrigerators in these "neglected towns" has not made more progress. Metropolitan centers offer concentrated areas in which good prospects are easily located and sifted, and quickly contacted. Apartment houses have presented a highly productive field for volume selling.

That the job of merchandising refrigerators to outlying districts needs to be studied thoroughly and developed soon, however, seems to be almost incontrovertible. Far-looking men like John Knapp can visualize a time when manufacturers may have to depend heavily on this market to absorb their output. And the longer sales organizations delay their wrestling with this problem, the longer it will take them to learn the formula for penetrating and capturing the market.

At present two refrigeration organizations are fairly well entrenched in the small towns—Frigidaire and Crosley. Neither, however, acquired its extensive distribution overnight. Frigidaire inherited a far-flung selling force "in the sticks" from its parent, Delco-Light, which (under R. H. Grant, now vice president in charge of sales of General Motors) laboriously built up a distributing organization in small towns all over the nation to sell farm-lighting plants.

Crosley has long been working on the hinterland market for radios. Building a low-priced line, doing very little national promotion, and insisting on maintaining an unusually long list of distributors and dealers, Powel Crosley, Jr., has made the study of selling to this market a life work. His refrigerators are now being sold through the same channels and by the same methods.

One trend which has been noticeable this year is that toward dual distribution of electric refrigerators. In the same city may be located two distributors for the same product: the first to sell to the metropolitan market by a master retail operation through its own stores and salesmen; the second to do a resale job through dealers to the outlying towns in the surrounding territory. There seems to be considerable evidence pointing toward a continuation and further development of this trend.

As yet little is known about specialty appliance merchandising in small towns. Yet it is more and more becoming apparent that the need for research along this line is urgent. John Knapp thinks so, and is spending many of his waking hours thinking about the problem. That some interesting information about this subject may be developed in the near future seems quite likely; and the entire industry should anticipate its coming with considerable eagerness.

WHAT OTHERS SAY

PRICE-FIXING: A WARNING

It seems quite likely that there will shortly be a showdown as to whether the NRA will permit price-fixing provisions in the retail and various manufacturing codes. It is no secret that the government is gravely concerned over the way prices, during the past few months, have been running away from purchasing power. It will be extremely chary before it grants industry or trade any further powers to raise or control prices.

The Fairchild retail price index has shown the following percentage increases since May 1:

June	1.4
July	2.6
August	5.2
September	8.4

Thus in this four-month period the increase has been in almost a geometric ratio—the percentage of advance nearly doubling each month. In certain representative lines such as textiles, ready-to-wear, accessories, men's wear, and children's wear, it is estimated that the advance since May is even more striking—over 30 per cent. Certainly, this is a storm signal of serious import.

A second storm signal is the marked slump in retail buying which occurred throughout the country around the middle of September. It is estimated that sales, which had been running 10 per cent ahead of last year at the beginning of September, may now do well to break even.

The picture is none too pleasing and strongly suggests that Paul Hollister, executive vice president of R. H. Macy & Co., Inc., is 100 per cent right when he states that certain manufacturers and retailers "are engaged in driving a wide, dangerous canyon between their own interest and that of the consumer."

More and more, it becomes clear that price-control experiments at the present time are most undesirable. They are liable to foster inefficiency, retard technical progress, and are wholly inconsistent with a competitive economy. The NRA, by abolishing the sweat-shop, is eliminating one of the chief sources of cut-throat competition. By the same token, it eliminates one of the chief reasons for price-fixing.—*Advertising & Selling*, Sept. 28.

Survey Shows How Utilities Get Aid Of Employees in Locating Prospects

CHICAGO—Employee cooperation in utility merchandising, where actively promoted and intelligently directed, will sometimes result in an increase of 50 per cent in the dollar volume of appliance merchandise sold by a utility, according to a report made at the national convention of the American Gas Association of a survey on employee cooperation in selling.

For one company alone the sales traceable to employee leads and activity amounted to \$273,121 in 1932, according to figures tabulated in the report.

An analysis which the committee made of 97 companies showed that 73 companies use employee cooperation in selling, 18 companies do not, while six others did not merchandise at all.

Education on Appliances

The conclusion of the committee was that where employee cooperation was employed in a wholehearted manner and with any degree of organization it promoted the greatest good for everyone and was a means of increasing the load.

Proper employee education, ample compensation for their efforts, and sales contests to keep alive employee enthusiasm are the principal factors in a successful program of employee cooperation.

With reference to education, the survey showed that of the 97 companies solicited, 53 provided educational classes for all types of employees, teaching the uses of the appliances sold, the types and styles, and how to properly explain these features to the customers.

Some of the methods used for the education of employees, as reported to the subcommittee, are as follows:

"1. Employees of the company have studied the American Gas Association Course on Customer Relations. Group meetings are held of the entire personnel, and talking points of the appliance merchandise are gone over with the help of manufacturers' agents. This enables the department employees to get a general background of the sales department's problems, and permits them to give an intelligent answer at any time to the prospective customer regarding our service and our equipment.

"2. The supervisor of employee selling periodically visited each department and with the cooperation of the department head conducted educational meetings in which the advantages of our appliances were explained.

"3. Employees in each district are divided into groups of from 7 to 10 each, with one person designated as group leader. Group meetings are held approximately every week, at which time prospects and new sales information are discussed.

"4. We have put forth much effort in organizing and training the head of each department so that he, in turn, can drill his department employees in the art of securing prospects wherever possible and in making sales direct.

"5. All employees are made interested in the promotion of sales through discussions in connection with periodic group regional meetings held for the purpose of employees' advancement and the understanding of various company departmental activities—with special reference to public relations, sales promotion, and safety activities. "These meetings are held monthly in the various districts and are usually under the auspices of employee clubs."

Lectures Used

Another company, in preparation for a one-month drive on range sales, laid out a lecture course for all of its employees. The employees were divided into small groups, and as the lectures were held on company time, attendance was compulsory. The lectures were printed and this information, together with a portfolio descriptive of the product, was presented to each employee.

The third and final lecture was accompanied by a skit in which the leader took the part of the company employee calling on the modern housewife. The housewife in turn asked approximately 40 questions representative of those which would ordinarily be asked a salesman. This visual form of training, it was found, helped to fix in mind the material of the previous lectures.

The following plan is representative of successful employee participation methods reported to the Gas Association subcommittee:

"We have in operation an employee participation plan which permits employees to register prospects for certain appliances and receive compensation. All employees, except those directly connected with merchandise sales department, are eligible for participation after registering their willingness to cooperate with the merchandise sales department.

"A prospect book is mailed to the employee and a careful record is kept of the employees using these books.

"The registration of the employee states that only those persons person-

ally interviewed will be submitted as prospects.

"When the prospect slip is received by the merchandise sales department it is checked with our sales prospect records and if no contact has been made by a salesman within the previous 60 days, the prospect is accredited to the employee submitting it.

"If, however, the prospect has been contacted by a regular salesman or another employee within the previous 60 days, the second employee is notified that the prospect has already been covered.

"If a sale results within 60 days from the filing of the prospect form, the employee submitting the prospect receives the following bonuses:

Electric refrigerator.....	\$ 4.00
Electric range.....	5.00
Electric water heater.....	5.00
Automatic gas water heater.....	5.00
Gas house heater.....	10.00
Electric ironer.....	2.00

Another utility favors the "percentage" method of compensating its employees for leads. Declares the report of this company:

"An inducement to get employees to turn in the names of prospects who might be interested in modern appliances we compensate each employee whose prospect results in a sale, on the basis of 2 per cent of the net amount of each sale.

"Each employee is supplied with a so-called prospect book on which he or she is urged to list the names of possible buyers together with the type of appliance desired, and other pertinent information.

"An analysis of our sales for the last four months of 1932 reveals the fact that \$58,897 of our total sales volume of \$112,298 were employee prospect sales. Thus, sales resulting from employee 'tips' were 52 per cent of the total (in dollar volume).

"During this period 5,810 prospect slips were turned in by employees, of which 832 results in sales, this equaling 14 per cent."

Paid on Percentage Basis

In a large utility organization the problem of properly handling employee tips becomes somewhat complex. The following is the mechanism of handling tips on which bonuses are to be paid in districts, as employed by one utility:

1. Master tip card is sent in by employee.
2. Master tip card is time stamped and received by tip clerk.
3. Tip slip is typed from master tip card.
4. Original tip slip is sent to salesman.
5. Master tip card is filed.
6. Salesman reports sale on original tip slip.
7. Tip clerk completes tip slip showing date of receipt of master tip card, date of sale, amount of sales, number of sales ticket. Tip slip then is to be approved for bonus payment by the district new business manager. On the 25 of the month a recap letter of all bonuses to be paid is to be written and signed by the district new business manager and chief clerk. This letter is to show all information appearing on tip slips. It is to be mailed to the accounting department.
8. The master tip card and tip slip are to be kept in a permanent file.
9. The accounting department will issue bonus checks for the employees after the monthly checkup.

Contests Spur Interest

Prize contests are often employed in addition to the "bonus" system as a method of stimulating employee participation in sales. One company, for example, inaugurated a "trip around the world" contest, whereby the employees, in addition to receiving a bonus for tips which resulted in a sale, received credit for moving a certain number of miles in the around the world trip. The five employees who "traveled" the greatest distances received additional cash prizes.

In order to encourage the use of appliances in the employees home, one utility, in a prize contest similar to the one described above, offered certificates to apply on appliance merchandise sold by the company, which certificates were nearly double the value of the cash prize offered.

A novel method of rewarding employees for prospect tips is described in the report of one company:

"In order that all may participate and receive some recognition for their individual efforts, it is planned:

"First, to give the employee one day off with pay when five sales points (predicated on the value of the appliance sold through his tip) have been acquired by him. For the second five points and each succeeding five points, thereafter, two days off with pay will be given.

"Second, the name of all employees listed on both teams will be placed in a box from which one name will be drawn at the end of every month. If an employee's name is drawn who is represented by a sale during the month from a prospect card of not over 90 days standing, he will receive one day off with day."

ENGINEERING

Motor Protection Needed for Certain Conditions in Refrigeration Systems

By E. B. Bremer, Manager of Appliance Electrification Sales
And C. G. Veinott, Small Motor Design Engineer
Westinghouse Electric & Mfg. Co.

It is generally recognized that it is uneconomical, in both first cost and operating expense, to apply a motor sufficiently large to operate a refrigerator under all conditions and not exceed the rated load. Conditions causing an abnormal temperature rise of the motor, such as an improper supply voltage or overloads, are bound to arise in service. A complete discussion and explanation

of these conditions would be too involved for this article and are probably sufficiently well known to make such a discussion unnecessary.

Perhaps a brief review of the principle of mechanical refrigeration will make clear why and under what conditions such overloads occur. The reason why both protection of the motor and full utilization of its overload capacity are necessary will then be apparent.

Briefly, the principle of the flooded refrigeration cycle, a cycle commonly used in domestic refrigerators, is as follows:

Principle of Flooded Cycle

Liquid refrigerant is evaporated in the low-side. It is this evaporation process which affects the cooling of the box. The resulting vapor, or gas, is compressed by means of a pump and liquefied in the condenser from whence the liquid refrigerant passes again into the low-side to repeat the cycle.

When in continuous operation, the evaporator is relatively cold, say, 0° F. But, under certain conditions, the temperature of the entire unit, including the evaporator, may be raised to as high as 110° F. The liquid refrigerant evaporates more rapidly under such a condition until it builds up greater internal pressures throughout the system and the gaseous refrigerant is much more dense.

Consequently, the pump at each stroke not only moves a greater weight of gas, but also discharges gas at a higher pressure. The result is a considerably increased load on the motor driving the compressor.

Power Input Doubles

Actual tests on a 1/4-hp. unit show a power consumption by the compressor of more than 1/2 hp. under these conditions, and this load does not decrease to normal for approximately one-half an hour, or until the evaporator temperature has been pulled down.

Thus, putting a refrigerator into service in a hot room, or restoring one to service when all the internal parts are at room temperature, imposes a long continued and severe overload on the motor of more than one-half hour's duration.

Moreover, the condition is further aggravated by the fact that the motor, already hot, has less overload capacity. It is often still further aggravated by improper supply voltage. Likewise, operation of the refrigerator after defrosting overloads the motor, although not necessarily as severely if the unit is started immediately after defrosting.

Need Is Recognized

All refrigerator manufacturers have long since recognized the need for adequate overload low voltage protection of their motors. They usually equip their product with a current-operated type of protection which normally is built into a cold control. Current-operated protective devices have certain limitations.

A motor driving a refrigerator in a 70° room will safely carry a given overload longer than it will in a 100° room. Primarily, no one is interested in how severely a motor is overloaded, except from the standpoint of danger of the motor itself being destroyed.

Fundamentally then, a protective device should remove the motor from the circuit when and only when the motor itself approaches a dangerous temperature. Therefore, the only logical place to mount such a protective device is on the motor itself and the only logical principle of operation is motor temperature.

It should not be overlooked, however, that the first principle of refrigeration is to preserve food. In order to safeguard the food at all times, it is imperative, when the refrigeration process has been interrupted temporarily because of a motor overheating due to abnormal operating conditions, that this motor be restored to service automatically at the earliest possible moment that it is safe to do so.

A protective device located on the motor and operated by motor temper-

ature can restore the motor to service when and only when it is safe to do so. Fuses and other current-operated devices are not ordinarily designed to restore service automatically.

A number of other characteristics are desirable. A protective device must be simple—it must make and break the circuit quickly in order to be long lived. It must lend itself to accurate calibration and this calibration must remain constant.

It must be so designed that it will handle, under normal conditions, the starting current which sometimes is 5 to 7 times the full-load current, without tripping and without in any way compromising the sustained overload calibration.

Requirements

It must be capable of interrupting the motor circuit directly, even under locked conditions, but must be small and compact. Moreover, motors for refrigerator service with built-in protection must be insensitive to the vibrations encountered in normal service.

The use of bi-metal in thermostats is, of course, common, but heretofore such thermostats have not been entirely successful for motor protection because they have been lacking in one or many of these desirable characteristics. But these characteristics are now to be had in the disc type bi-metallic thermostat. This device is in a circular dished shape of bi-metallic operating element.

Disc-Type Thermostat Widely Used

The disc-type thermostat was introduced initially some years ago on flatirons to control the temperature and has since been applied to several million heating appliances. This extensive application is due, to a very great extent, to its interrupting capacity obtained through the rapid separation of the current-carrying contacts.

The disc is normally convex. When the disc is heated, there are internal stresses set up because of the difference in the co-efficients of expansion of the two metals. When the temperature reaches a predetermined point, the disc snaps over to a concave shape, separating the contacts at more than twice the velocity of sound.

Temperature of Motor Frame

Repeated tests taken with thermocouples on refrigerator motors of modern design have proved that even under the most severe overloads the temperature of the frame of the motor differs from the temperature of the windings by only a few degrees.

No need then to put the thermostat on the windings themselves, as such practice would necessitate increasing the physical dimensions of the motor. Some means is necessary, however, to compensate for the fact that under locked rotor conditions the windings would be destroyed before the exterior of the motor had time to absorb sufficient heat from the windings to operate the thermostat. To provide against such a possibility, an auxiliary heater arranged in close proximity to the bi-metal disc is necessary.

When the locked current of the motor flows through the heater, sufficient heat will be radiated to the disc to actuate the thermostat and clear the motor from the line, even though the frame of the motor has not sensibly changed in temperature. Such a motor has been locked on the line for over four months to date and is still in perfect condition.

Apex Sales Convention Held in Chicago

CHICAGO—One hundred fifty retailers of Apex-Rotorex Corp.'s electrical appliances attended a sales convention at the Bismark Hotel here Sept. 28 and 29. Factory officials in charge of the sessions were H. R. Lanning, vice-president in charge of the Chicago branch, C. W. Smith, midwest sales manager, and J. M. Michaels, educational director.

3 TYPES OF MOTORS FURNISHED BY DELCO

By R. O. Yost
Sales Dept., Delco Products Corp.

THERE are at the present time three different kinds of condenser motors being manufactured by the Delco Products Corp.:

1. Condenser-transformer.
 2. Condenser-start.
 3. Condenser split-phase or condenser permanently connected in circuit with no switching mechanism.
- A number of trade names have been applied to the above types of motors as for example the name "Capacitor." This name was coined by General Electric Co. to differentiate a condenser as used on electrical circuits from mechanical condensing apparatus.

Motor Characteristics

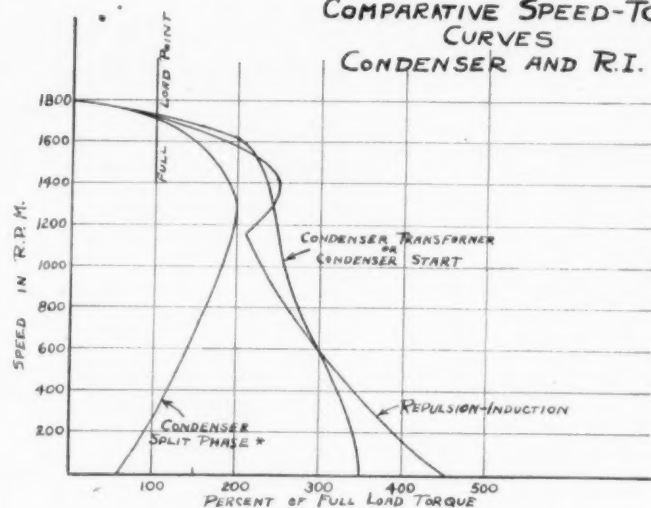
Any given application of a motor should be considered carefully from the standpoint of performance required of the motor for that application. For the convenience of the reader a comparative list showing the relative characteristics of repulsion-induction (RI) type motors and condenser-transformer (CT), condenser-start (CS), and condenser-split-phase (CSP) type motors.

	CT	CS	CSP	RI
Starting Torque %...	350	350	75	450
Pull-out Torque %...	250	250	200	250
Pull-in Torque %...	250	250	200	200
Power Factor %.....	75	60	50	60
Efficiency %.....	63	60	50	60
Locked Current, amp.	14	14	5	9

From the above it is plain that choice of the proper type of condenser motor is something that every engineer must decide before applying it to

Performance Curves

COMPARATIVE SPEED-TORQUE CURVES
CONDENSER AND R.I. MOTORS



* CONDENSER PERMANENTLY CONNECTED—NO SWITCH

Comparison of speed-torque characteristics of condenser-transformer, condenser-start, and condenser-split-phase motors.

the load.

For further reference the above curve shows the speed characteristics for all of these motors. The repulsion-induction motor has been included because its characteristics are well known to most engineers.

Condenser-Transformer Motor

The condenser-transformer motor will do the most. It has good starting and accelerating torque and very good running characteristics. Due to its operation as a polyphase motor after up to speed it does not have as much single-phase torque pulsation noise and gives a quieter application

than a repulsion-induction or split-phase motor.

The condenser-start motor has good starting accelerating torque but does not use the condenser after the motor is up to speed so does not give running characteristics any better than the repulsion-induction or split-phase motor. It is somewhat cheaper than the condenser-transformer motor.

The permanently connected split-phase motor is only suited for loads taking very low starting torques such as fans. The running characteristics are good, and the motor is quiet. It also has the advantage there is no switch required.

IN WHICH WE REVIEW SOME OF OUR 1932 ADVERTISING

"PRESENT GAIN—FUTURE LOSS

We know that every policy which we adopt is either helpful or injurious to our industry, and therefore to ourselves. We know, further, that while we may apparently gain by some destructive procedure that gain is only temporary. Therefore, as a matter of good business, we endeavor to make every policy for every department of our organization a constructive one."

We have always been firm believers in the constructive policies which industry is now inaugurating under governmental auspices. This is evidenced by the foregoing Universal Cooler advertisement which appeared during 1932.

UNIVERSAL COOLER CORPORATION
DETROIT, MICHIGAN
BRANTFORD, ONTARIO

MANUFACTURERS OF A COMPLETE LINE OF HOUSEHOLD AND COMMERCIAL REFRIGERATION EQUIPMENT

OSCILLOGRAPH USED TO STUDY ARCING OF CONTROL'S CONTACTS

By L. M. Persons, Chief Engineer
Penn Electric Switch Co.

THROUGH an intense study of the contact action of switches by means of the oscillograph in the Penn laboratory, important improvements have been made in the closing action, and the life and capacity of controls.

The oscillograph is an instrument used to visualize the instantaneous performance of electrical circuits. A galvanometer of the reflecting type in the oscillograph directs a beam of light through a system of prisms on a rapidly moving photographic film, thus recording a line on the film, the position of which is controlled by the galvanometer. Variations in the value of the current in the galvanometer circuit, caused by closing the switch contacts offset this line, lowering it as current passes through the contacts.

In making these oscillograph records, several successive cycles of operation were recorded on a single film. The continuous lines shown on the records simply represent the galvanometer position at a time when the contacts were open and at some other part of the test than when the closing action was recorded.

The total closing time of the switch shown on the record reproduced in Fig. 1, that is, the time from the first closing until the contacts show no further separation, is about one-hundredth of a second. This represents vibration and bouncing of the contacts with a consequent burning and possible welding during this period, which for usual circuits is the period of maximum current flow.

Through Eyes of the Oscillograph

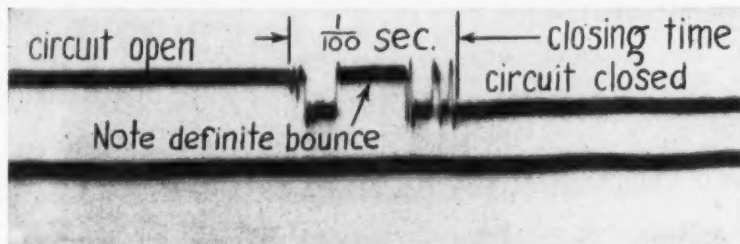


Fig. 1—Circuit closed in 1/100 second, with bouncing contacts and arcing.

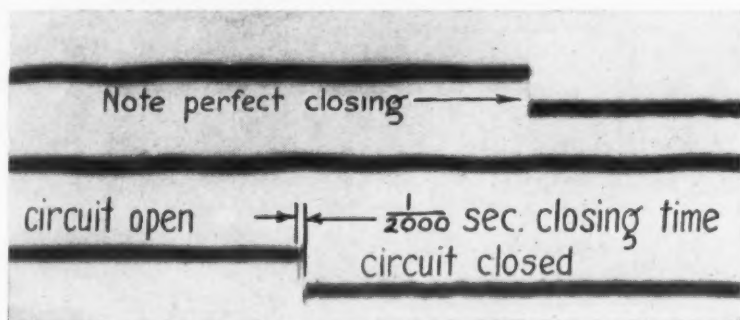


Fig. 2—Improved closing, with practically no bouncing in 1/2000 second.

The new development, however, has made possible, through a combination of new design and proportions of contacts and mounting, a contact action which is nearly perfect, as shown by oscillograph record, Fig. 2. Here the duration of the closing period is about one two-thousandth of a second, or less than 5 per cent of the bouncing or burning time of the usual construction, as recorded in Fig. 1. Many records were made showing practically perfect closing (instantaneous) as shown in

the upper record of Fig. 2.

The importance of proper closing of the switch contacts lies in the fact that excessive bouncing creates an arc which burns and melts the contacts to such an extent that it is possible in some cases to cause welding. On the other hand, the opening of the circuit should be rapid in order to limit the arc and minimize the burning and melting of the contacts, but is of much less importance as welding cannot occur in this action.

TEST INSTRUMENTS HELP SERVICE MEN IN CONTROL WORK

By A. F. Rucks
General Sales Manager,
C. J. Tagliabue Mfg. Co., Brooklyn

DUE to the importance of the electrical control in the successful operation of an electric refrigerator, the service engineer should familiarize himself with a few simple rules and tests before he attempts to make any adjustment to the controller mechanism.

In a great many cases where controls are returned to the factory claimed to be defective, an inspection shows there is nothing wrong with them except that the service man jumped to the conclusion that the trouble was caused by the instrument.

Many service men, not sufficiently experienced with the control mechanism, try to make their own adjustments and often put the controls in

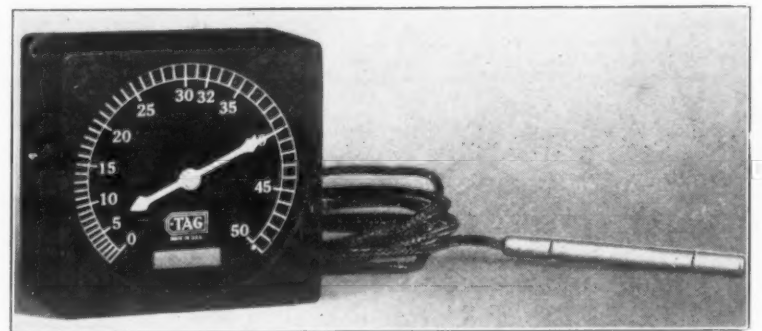
observed at all times without opening the refrigerator door.

Dial-indicating and recording instruments, while more costly than the average glass tube pocket thermometer, are easier to read and more accurate to use in checking the evaporator coil temperature. In a great many instances, complaints about incorrect food compartment temperatures are nothing more than imaginary, and it is very often possible to convince a housewife that her refrigerator is maintaining the correct temperature by showing her an actual temperature record.

Due to the large number of different makes of refrigerators on the market, the service engineer is frequently confronted with the problem of obtaining a replacement temperature control.

Often he cannot secure exactly the same control that he found on the refrigerator. Sometimes the length of connecting tubing may vary or the temperature setting may be slightly different. In some cases when the replacement control is operating at too high or too low a temperature, it can be reset easily by the outside adjusting knob, or if desired, the bulb can

For Field Tests



Tag dial-type indicating thermometer for service men to test performance of refrigerators operating in their customers' homes.

such a condition that they could not possibly perform. Very often, improper operation of the expansion valve makes it appear as though the temperature control is at fault.

If a temperature control has been operating satisfactorily and suddenly fails to make circuit when the box temperature rises, the trouble is generally caused by one of two things.

Causes of Control Troubles

First, inspect the wiring for a loose connection. The connecting wires of the latest models are attached to a plug which fits over prongs projecting from the back of the control case, and the service man should make certain that this plug is securely fastened to the prongs.

The second place to look for trouble is in the tube system. Occasionally the tube system develops a leak, due to a break in the tubing or an imperfection in a soldered joint. If the contacts of the control do not close on a rising temperature, it is safe to assume that a leak in the tube system has occurred and the only remedy is to replace the control with a new one.

Instruments for Service Men

Various instruments are available to guide the service engineer in his work. A miniature size dial-indicating thermometer, pictured below, measures only 4 in. square, and can be used effectively to check the thermostat setting and to observe the operation of the expansion valve by means of the temperature changes on the evaporator coil.

The dial thermometer can be placed on top of the refrigerator and the bulb located inside the box by means of a fine capillary tubing, which connects the instrument proper with the bulb. The tubing is small enough to permit the refrigerator door to close tightly on it without causing damage. With this dial thermometer the service engineer can watch the performance of the unit and check the evaporator coil or food compartment temperatures without opening the refrigerator door.

Recording Thermometers

Another miniature size instrument known as a recording thermometer, measuring only 6 in. square, can be used in place of the dial. This instrument records the temperature on a paper chart. It is supplied in two models, one a regular recording thermometer, and the other a combination recorder is connected in circuit with the motor, and by means of two pens it records running and idling time of the motor and the temperature of the evaporator coil or food compartment.

These recording instruments are made in the self-contained and distance types. The self-contained type is recommended for use when it is desirable to place the entire instrument in the food compartment. The distance type permits the bulb to be placed in the food compartment or on the evaporator coil, and allows the instrument to be located outside of the box so that a complete record can be

be shifted to another coil, and the excess tubing coiled into a spiral behind the evaporator shield.

On commercial refrigeration systems where fairly large storage rooms are being cooled, temperature controls are very often installed with the bulb located within the room itself. Care should be exercised in locating the bulb so that material is not piled around it, interfering with the air circulation.

Place Bulb in Air Circuit

If the control bulb is located in a dead air pocket, the control will not maintain a uniform temperature throughout the room. In installations where a blower is used, it is advisable to place the bulb near the blower so that the control will regulate the temperature of air being circulated through the room.

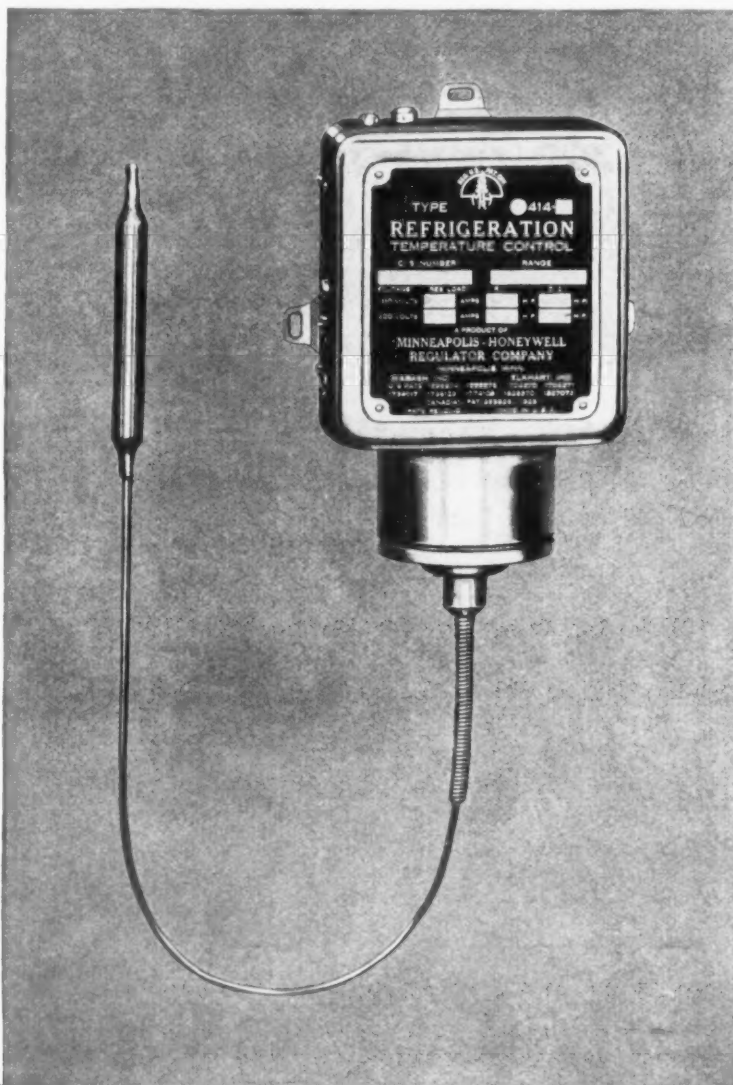
The service engineer should endeavor to familiarize himself with the construction of pressure and temperature controls used on commercial refrigerating machines. These instruments in general are simple in their construction, and the adjustments (while not as readily accessible as controls on household refrigerators) are easy to make.

The indicating gauges which every service man uses, should enable him to make adjustments to get proper temperature control in any refrigerated application.

REFRIGERATION CONTROLS

ANY RANGE...

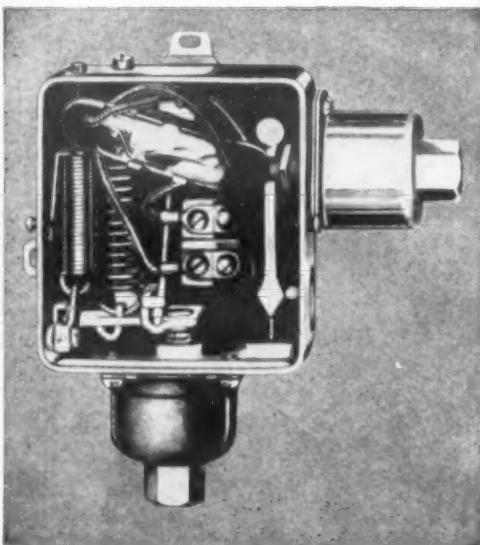
Temperature
or
Pressure



■ REFRIGERATION TEMPERATURE CONTROL T414

MINNEAPOLIS-HONEYWELL Refrigeration Controls are available in any desired range, either temperature or pressure... They are ideally suited for any type of commercial installation, industrial process or cooling equipment, as well as to domestic or commercial air conditioning systems... Visible scales, locking and leveling devices, and Con-Tac-Tor mercury switches are some of the features of these outstanding controls... Sturdy, simple and dependable, they will provide years of trouble-free performance characteristic of other Minneapolis-Honeywell controls... Minneapolis-Honeywell Regulator Company, 2807 Fourth Avenue South, Minneapolis, Minnesota. Branch and distributing offices in all principal cities.

MINNEAPOLIS-HONEYWELL
Control Systems



■ Refrigeration Pressure Control L413 with high pressure cutout, showing simple, sturdy internal construction with Con-Tac-Tor mercury switch and leveling indicator.

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DEPENDABILITY!

Dependability is a quality that is paramount in Ansul Sulphur Dioxide. You will find a guaranteed analysis on every cylinder of sulphur dioxide that leaves our plant for refrigeration purposes.

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COMPANY**
MARINETTE - WISCONSIN

Characteristics of Capacitor Motor Well Suited To Refrigeration

By G. E. Cassidy, Fractional Horsepower Motor Engineering Dept., General Electric Co.

THE power supply for domestic refrigerators is dominantly single phase and the range in horsepower required usually from $\frac{1}{8}$ to $\frac{1}{4}$ horsepower so that for domestic refrigerators, interest in driving motors is centered primarily about single-phase motors and about motors of the above range in capacity. The G-E single-phase motor for domestic refrigerator service is the capacitor-type motor, designated by the type letters KC, and designed particularly about the requirements of such refrigerators.

These motors are of either the capacitor-start type or the capacitor-start-and-run type generally referred to simply as the capacitor type.

The stator has two windings displaced from each other by 90 electrical degrees. While the motor is stationary, or coming up to speed, both windings are energized. The capacitor is connected in the circuit of one winding and with the consequent different impedance values of the two windings, the single-phase power supply is transformed into an equivalent two-phase power supply. Thus the motor, which has a squirrel-cage rotor, starts in much the same manner as a conventional two-phase induction motor.

Centrifugal Switch Operates

At a predetermined speed somewhat below operating speed a centrifugal switch device, with which the motor is equipped, functions in the case of the capacitor-start motor to cut out one of the windings, the winding in which the capacitor is connected, and the motor thereafter operates on the remaining winding as a simple single-phase squirrel-cage rotor motor.

In the case of the capacitor-start-and-run motor, the centrifugal switch device functions to change the value of the capacitor to a suitable running

value and the motor then operates with both windings energized.

Capacitor motors have good running characteristics and reserve capacity. Efficiency is high with consequent economy of operation. Starting and accelerating torques are liberal, and there is no dip or pronounced reduction in torque as the motor comes up to speed. Quick and positive acceleration is assured.

Reduces Radio Interference

Quiet operation and a minimum possibility of radio interference are directly sought for in the design of these motors and they can be used without hesitancy in the home where these features are important.

Where exceptional quietness is required and a resilient mounting is not included in the refrigerator proper, a standard resilient base built in as an integral part of the motor is available.

Wool-packed bearings with large oil capacity are used throughout. Stators are of welded rolled steel shell construction which uniquely combines strength and rigidity with light weight.

Drip-proof construction is common to all ratings. A terminal board is built into the motor end shield which permits connections to be made conveniently either with cord and plug or by conduit wiring.

All ratings in the range $\frac{1}{8}$ to $\frac{1}{4}$ hp. have the same mounting dimen-

sions and the same dimensions whether the motors are for solid base or resilient base mounting.

Interchangeable single-phase odd-frequency, direct-current and poly-phase motors made up of the same basic construction and with the same external appearance and finish are available.

Winding terminals are brought to studs on the terminal board inside the end shield connection box. Connections are generally made by cord and plug. A lead clamp incorporated in the cover of the box securely clamps the cord in place.

A boss is provided at the side of the connection box. Where it is desired to do so this boss can be drilled for connection by conduit wiring and fittings can be furnished for either single or double conduit.

The motor terminal board is arranged so that if it is desired to reverse the direction of rotation this can be conveniently done by simply interchanging the motor winding leads. Terminals are also included which permit easy interconnection between the motor and its control.

All oil in the housing is held in suspension by the wool packing and the housing, with the exception of the shaft openings, is sealed against oil leakage. When shafting passes through the bearing housing it is equipped with oil throwers so that the oil as it passes out of the bearings is thrown into the housing oil returns.

A steel plate shaft oscillation damping feature design is built into the bearing housing as an integral part of the housing. This plate suppresses a tendency of the shaft to oscillate.

Rotors

All rotor windings are of cast construction. The windings are processed so that they are homogeneous throughout and without any connections that might loosen.

The centrifugal switch actuating mechanism functions on the principle of increased weight radius to open the switch and decreased weight radius to close the switch so that snap action occurs both in disconnecting and con-

necting the motor windings.

The G-E stators are built up with steel plates with integral end rings wrapped about the punchings under pressure, and then welded together.

Application of Motors

Some general notes on the application of motors to domestic refrigerators may be of interest.

The starting-torque load generally is composed of friction between moving parts and gas pressure on the piston. On externally driven units, the gas seal friction between the shaft and compressor at start may be from 25 to 50 per cent of the total torque required.

If the unit contains an unloader, the load due to gas pressure is eliminated but even so the seal friction is generally sufficient to make it desirable to use a motor with high-starting torque.

The pull-up torque load is composed of friction between moving parts, inertia, and gas compression. Reduction of the back pressure when the unit starts reduces the pressure on the seal and hence the seal friction.

In units without an unloader, the load due to gas compression generally builds up very fast requiring a motor of high pull-up torque.

The running load varies considerably depending upon the part of the refrigeration cycle at which the unit is operating and upon the temperature surrounding the unit.

Heaviest Running Load

The highest running load occurs during pull down in a high ambient temperature and may be very much higher than the normal load encountered after the refrigerator has been pulled down so that it operates in cycles.

The duration of high load on a motor during pull down may last several hours under severe conditions and the driving motor should therefore have good thermal capacity.

Information somewhat as follows is very helpful in making the proper selection of motors.

A. General descriptive information including:

1. Construction of the refrigerator—

hermetically sealed or externally connected.

2. Connection to the compressor—belted or direct.

3. Type of compressor—rotary or reciprocating.

4. Displacement per revolution and speed of the compressor and for reciprocating compressors, the bore and stroke.

5. System of refrigeration—flooded system or dry system.

6. Kind of refrigerant used.

7. Whether or not an unloader is used.

B. Pull down test in hot room with the following readings.

1. Input watts, amperes and speed of the motor on rated voltage taken at start of the pull down and at frequent intervals (3 to 4 minutes) until the peak load is reached. Then at longer intervals (15 minutes) until the load becomes stable. The readings should include head pressure, back pressure, evaporator temperature and room temperature for each of the readings.

2. The minimum starting voltage at the beginning of pull down and when the head pressure is a maximum. These readings should be taken first with the compressor set in the hardest part of the cycle, that is against compression, and second with the compressor set in normal stopping positions. The data should include head pressure and back pressure for each reading of starting voltage.

3. The minimum pull-up voltage at the beginning of pull down and when the head pressure is maximum with the corresponding values of head pressure and back pressure.

4. The minimum running voltage at maximum load with corresponding values of head pressure and back pressure.

MURDOCK HEADS SERVICE FOR MERRIAM, INC.

SCHENECTADY, N. Y.—Appointed to head the new service department of A. Wayne Merriam, Inc., General Electric distributor here, Roy Murdock took over the position Oct. 1.

These 3 FEATURES exclusive with DELCO MOTORS



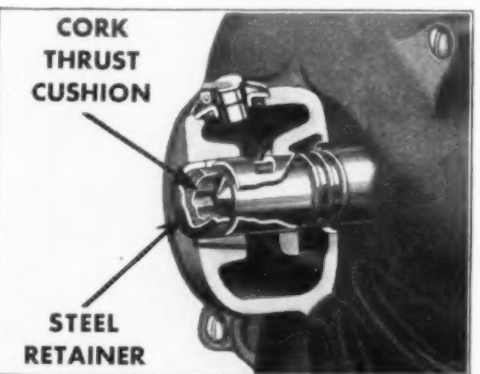
Non-spillable end-head . . .

Both over-oiling and leaking on the windings are effectively prevented by this exclusive feature of Delco refrigerator motors. In combination with the patented oil reservoir and the special arrangement of the wick and oil control, this improvement in Delco motors also assures retention of oil during shipment, installation, and operation. These advantages constitute Delco's SEALED LUBRICATION—an important factor in assuring satisfaction to your owners long after the warranty period of the refrigerator itself has expired.



Rubber cradle mounting . . .

By literally floating the motor in rubber, with no metal-to-metal contact whatever, this second exclusive Delco feature completely insulates the motor mounting against vibration and noise. The rubber is vulcanized to both the motor ring and the mounting. It permits sufficient rotative twist, yet prevents mis-alignment of shaft or pulley. Creeping is impossible, and oil cannot get in to cause deterioration. This rubber cradling is another reason why Delco motors help to keep the users of Delco-powered refrigerators satisfied.



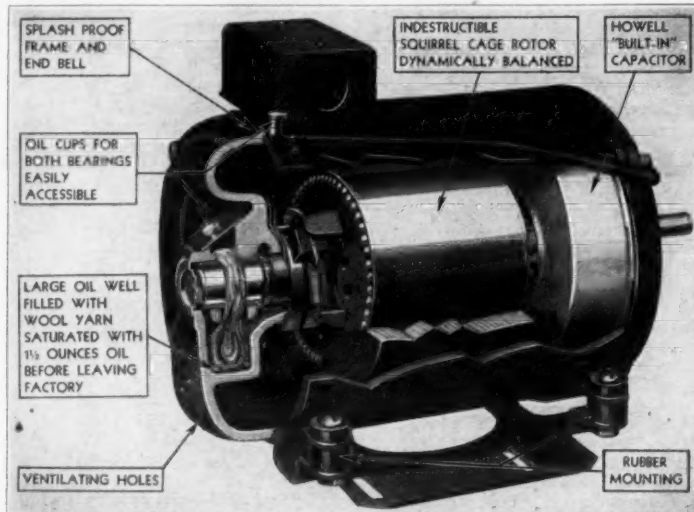
No end-play noise . . .

End-play is inescapable in motors which operate belt-driven compressors. Delco motors, however, eliminate the usually attendant noise with a cork insert, pressed into the end-head of the steel shell. This cork cushions the longitudinal movement of the rotor. It is amply lubricated always . . . will not wear out . . . and needs no adjustment or replacement. Its elimination of end-play noise is, consequently, a permanent advantage of Delco refrigerator motors. For your customers' satisfaction, and in the interests of your warranty costs, consider all three of these exclusive features when you select compressor motors.

Delco motors are on display at
A Century of Progress



DELCO PRODUCTS CORPORATION
DAYTON, OHIO



Consider These Motor Facts

IN considering your motor needs keep in mind the fact that back of the Howell perfected Capacitor Start Motor, is over five years of pioneering development—not one year—but over five years.

That means something in de-

pendable motor service—to the dealer—to the manufacturer.

That same quality that has made Howell Red Band motors make good on the hard jobs in industry, is inherent in the Howell Capacitor Start Motor for refrigeration.

Howell Sales and Service in over 50 Principal Cities

Howell Electric Motors Co.

Howell

Michigan

Pioneer Builders of Capacitor Start Motors

G-E'S NEW CONTROL HAS SPRING RETURN ON DEFROST SWITCH

By E. S. Bush
Industrial Dept., General Electric Co.

THE General Electric line of domestic refrigerator controls for 1934 will include several new forms, making available to refrigerator manufacturers such features as defrost with automatic return, and quick freeze with automatic return.

The basic form of the control includes a manually operated on-off switch, a thermal overload device to protect the motor against sustained overload and stalled rotor current, and temperature control.

Defrosting Feature

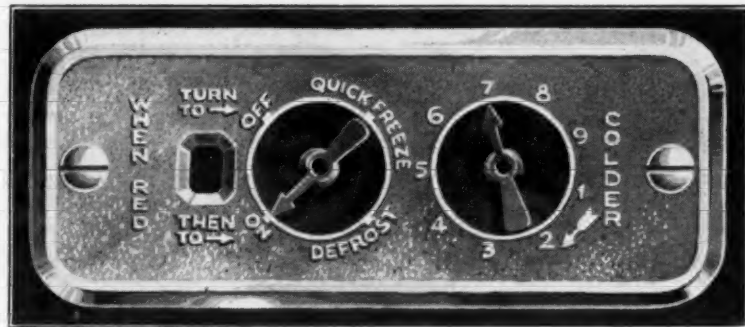
The old conventional method of defrosting by means of placing warm water in an ice cube tray to remove the ice from the evaporator is being superseded by several new methods.

The simplest means of providing the defrost feature is on the temperature control knob by making the temperature range broad enough so that when the temperature control knob is in the warmest position, the machine will cycle at a sufficiently high evaporator temperature to defrost it.

The differential (difference between cut-in and cut-out temperatures) is approximately the same on all positions of the temperature control knob. The design of some refrigerators is such that this method of defrosting gives too high an average evaporator temperature during defrosting, and cannot be successfully applied.

The use of this method also makes it necessary to change the position of the temperature control knob. Inas-

Independent Defrost Dial



General Electric's 1934 control has a separate knob for "defrost" and "quick-freeze" positions. The knob automatically returns to normal operation when "wide cycle" defrosting or quick freezing is completed.

much as it is generally conceded that the average user finds a pet position for best operation from the standpoint of freezing cubes, maintaining satisfactory box temperature, and using a minimum of power, this method is not as preferable as the one described next.

"Wide Cycle" method. This method provides for raising the cut-in temperature to a predetermined value at which the evaporator will be completely defrosted without changing the cut-out temperature setting.

This gives a lower average evaporator temperature during cycling, and keeps the average refrigerator box temperature below the danger line, providing the user returns the knob to the on-position within a reasonable length of time. This feature is incorporated in the G-E control unit by using another position on the on-off switch.

This isolates the defrosted feature from the temperature control knob and makes it unnecessary to disturb the temperature settings of the switch to defrost. The General Electric unit is designed so that irrespective of the position of the temperature control knob, when the on-off knob is turned to the defrost position, the same predetermined defrost cut-in temperature is secured.

The most recent feature in defrosting is to make the wide-cycle type automatically returned to the normal running cycle. General Electric Co. will have this feature available in 1934 refrigerator controls.

Quick-Freeze Feature

One of the newest features developed for domestic refrigerator control is what is known as "quick-freeze," to freeze ice cream or other desserts more quickly than on the ordinary cycle obtained on the cold position of the temperature knob. The following quick-freeze features are available for the coming year:

Manual Quick Freeze. A fourth position will be incorporated on the rotary on-off switch, which will lock the contacts closed except when they are tripped as a result of an overload. The unit will run continuously until the knob is returned to the on-position, where the machine will operate on its normal running cycle.

Quick Freeze with Automatic Return. This feature will cause the refrigerator to operate the same as the manual device except that when the temperature of the evaporator has gone down to a predetermined low temperature, the quick-freeze operation will discontinue automatically and the refrigerator will operate on its normal run-

ning cycle.

By incorporating the quick-freeze feature on the on-off knob it is isolated from the temperature control knob, thereby making it unnecessary to change the temperature settings of the unit.

Overload Protection

The overload is of the solder-film type. Visual indication of an overload trip is given by means of a red indicator through a small window. In order to reset the switch, the switch knob is turned to "off," at which position the overload mechanism is re-engaged, but the contacts are held open.

Turning the knob to "on" puts the control back into normal operation. This is known as the trip-free type of overload. It is impossible to lock the overload feature and have the motor run as long as an injurious overload exists on the motor.

The overload heater is installed in the factory and cannot be changed without breaking the seal in the side cover. This insures the application of the proper overload heater for the particular motor used.

It may be interesting to know just how a heater is rated. If a heater is rated four amperes, it means that with the heater installed in the particular device in question, and four amperes is applied continuously, the overload must trip eventually (one to two hours) in a room ambient of 40° C.

If the motor and control on the refrigerator are both mounted on the outside of the box, both are subjected to approximately the same ambient and the heater characteristic curve will follow closely the temperature curve of the motor.

However, if the control is mounted on the evaporator, it will require approximately 25 per cent more current to trip the overload and proper allowance must be made if the motor is to be fully protected.

The temperature control knob on all G-E controls is fastened by means of a screw which is sealed. This seal can only be removed by marring or spoiling it and the service man can easily determine whether or not the setting has been tampered with by the user.

Connections are made to the control by means of a special connector, which locks automatically when pushed on, but must be turned slightly to remove it. This prevents accidental disconnecting and possible service calls.

The General Electric control can be mounted either from the front or the back of a plate and nameplates can be furnished to suit individual requirements.

To the Manufacturers of Evaporators, Condensers, Valves, Tubing & Fittings

It is a conservative estimate that 1933 household refrigerator sales will exceed 1,000,000 units, making a new all-time record. Signs now point to an equal or greater sale during 1934.

Now is the time for sales action if you are to get your share of this next year's business.

Refrigerator manufacturers are now making plans for 1934 models. Many new plans will call for changes which will open new opportunities for the type of equipment which you make. Rising prices are bringing about early buying of component parts and materials. All of which means that now is your big selling season.

In the October 25 issue of Electric Refrigeration News the editors plan to feature engineering articles reflecting progress in design and application of condensers, evaporators, valves, fittings and tubing. With this will be included descriptions of new products and a directory of manufacturers.

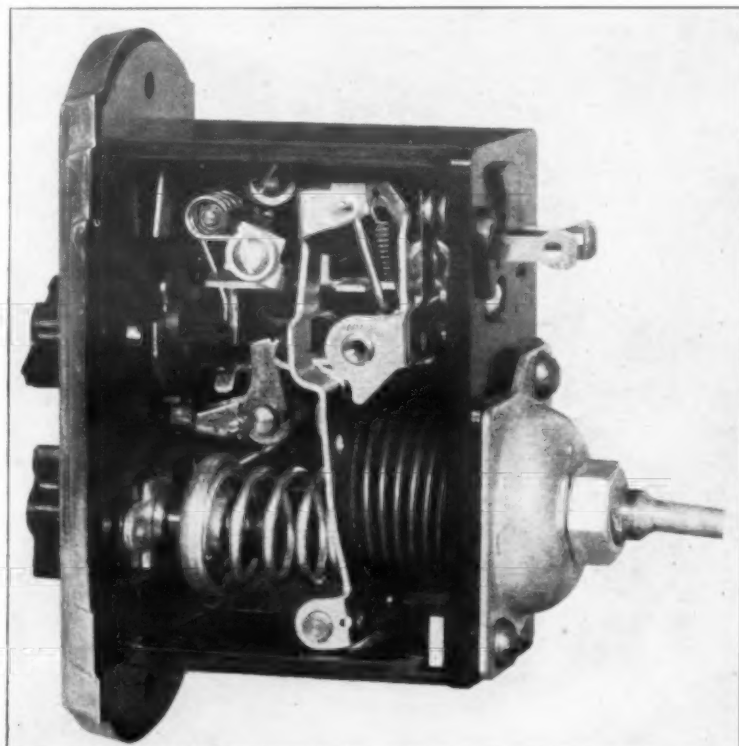
The October 25 issue will be read and kept for reference by executives who buy and engineers who specify. While every issue of Electric Refrigeration News represents a sound advertising value, this particular issue offers you, as a manufacturer of component parts, an unusual opportunity to tell the prospective buyer who you are and what you have to sell.

Reserve your space now. Advertising forms close October 21.

**ELECTRIC
REFRIGERATION NEWS**

550 Maccabees Bldg., Detroit, Mich.

Interior View



General Electric control for household refrigerators with cover removed to show wide cycle defrosting mechanism.

Minneapolis Air-Conditioning Control Operates within Comfort Zone

By L. B. Miller, Refrigeration Division
Minneapolis-Honeywell Regulator Co.

DURING this past summer Minneapolis-Honeywell Regulator Co. made an extensive survey of the air-conditioning field with particular interest pointed toward the analysis of control requirements for comfort cooling. The result of this work has been the development of a new control system, which in reality is an "Effective Temperature Control" inasmuch as it includes the principal factors present in the cooling cycle for comfort.

The severity of the weather during the past summer has brought to light a number of important factors, and has demonstrated the necessity of an adequate and accurate control system to regulate the operation of the cooling means.

A control system must have not only these two characteristics, but also must be very flexible in its application in order to care for the wide variety of systems that are being installed. It is apparent that the type of system designed to serve small business institutions like beauty parlors, barber shops, etc. must be different than that type of system that is used for theaters, restaurants, cafeterias, etc.

Present practice incorporates the division of the cooling cycle into two factors: sensible cooling and dehumidification. Furthermore, the necessity of biasing inside temperature with the outside temperature has been definitely indicated and the proper consideration of relative humidity in the cooling cycle has definitely asserted itself.

Outgrowth of Modutrol System

The new control system which the Minneapolis-Honeywell company has developed is an outgrowth of the Modutrol System, the fundamental characteristics of which have been used by the company for several years in connection with the heating and ventilating of buildings as well as in the accurate control of industrial processes.

In fact, the only thing new in the system is the grouping in a different manner of factors that enter into comfort-cooling work in such a way as to obtain a new set of results.

The fundamental basis of the system is that of establishing an electrical balance between several variables and controlling whatever equipment is to be regulated by the resultant of this balance.

In the case of cooling equipment this would be the control of dampers, valves of all classes including two-position or on and off type, modulating or proportioning valves, and compressors.

In its simplest form, the Effective Temperature Control consists of four principal units as follows:

'Effective Temperature Control' Units

1. An inside temperature control which follows the changes of inside dry-bulb temperatures in the conventional manner; biased by
2. An outside temperature control which is affected by changes in outside temperature to regulate the operating limits of the inside temperature control in accordance with recommendations of the American Society of Heating and Ventilating Engineers.
3. An inside relative humidity control which is sensitive to changes of inside moisture content. This instrument is of the new design, and incorporates a number of unique design characteristics.
4. A special relay for on and off operation used in the control of valves and compressors which demand such action, or the standard Modutrol motor which may be used to operate dampers or valves of the modulating or proportioning class.

Operation of the Control

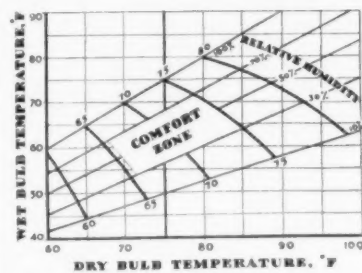
The operation of the control is as follows. In the first place, the final result of the Effective Temperature Control is predicated on an air movement of from 15 to 25 ft. per minute, and its regulation under this condition is therefore designed to operate within the limits of the comfort zone (for cooling) as established in the psychrometric chart.

The outside temperature control raises and lowers the operating point of the inside temperature control in accordance with the A.S.H.V.E. curve.

This resultant inside temperature is then combined with the inside relative humidity through the action of the control device which is so correlated that as long as the resultant of the three factors falls within the limits of the comfort zone, the cooling means will not be called into operation.

However, should the fluctuation of any one of the three factors in the

Comfort Zone



Westinghouse chart of effective temperatures for comfort.

group cause a severe unbalance of the conditions, the cooling means will be called upon to operate.

A study of the summer cooling comfort zone will indicate a rather wide spread of limits of both the inside dry-bulb temperature as well as inside relative humidity and therefore as long as the resultant of these two components are within the limits of this zone, no cooling should be required.

If then, a control can be effected that will recognize only values that are without this zone, it is apparent that a very definite saving in cost of operation should be forthcoming.

Separate Function Control

The system is so arranged that sensible cooling means and dehumidification means may be separately controlled. The sequence with which these means are called into operation is dependent entirely upon the desires of the manufacturer and the operation may be described as follows.

If the system calls for cooling, it may be arranged to call into play the sensible cooling means. Then, if the relative humidity increases beyond the limits of the comfort zone, even though the sensible cooling means may be in operation, the control will call into play the means for dehumidification. If the conditions of the installation demand a reversal of this sequence, the system is readily adaptable to the reverse operation.

Minimizes Dehumidification Cost

It is obvious that the cost of dehumidifying is more than the cost of sensible cooling, and therefore if dehumidifying is called for only when the inside conditions are outside the limits of the comfort zone, an appreciable saving should result from such operation.

As outlined previously, the control will be available in two different styles, one for modulating action of dampers and valves, and one for on and off or two-position operation. In connection with the latter system the balancing relay integrates the combined functions of the three governing controls. As long as the balance of these three functions remains within certain limits, the controlling relay will not operate.

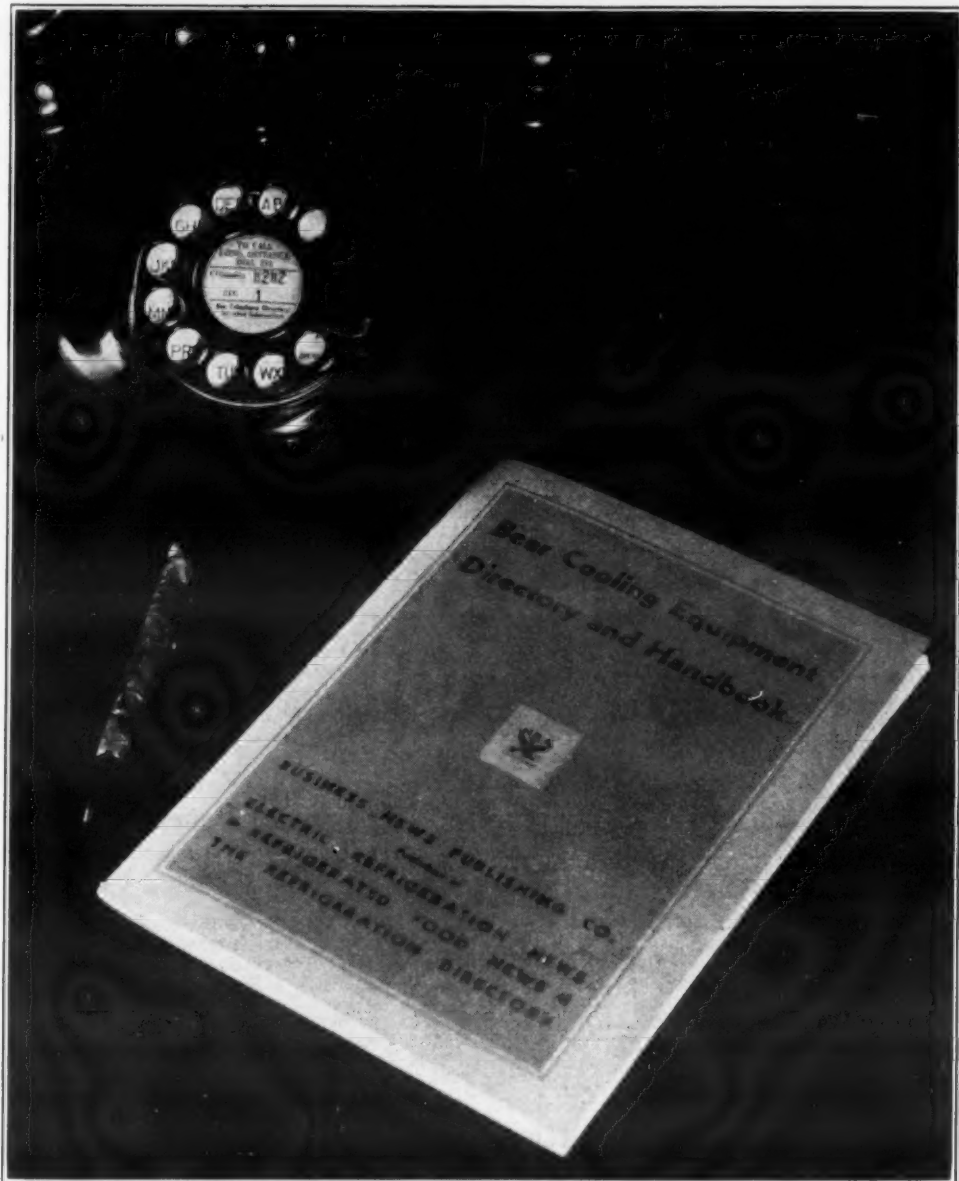
Balancing Relay

However, should any one of the three functions create an unbalance in the circuit, the balancing relay will in turn operate the controlling relay to regulate the means to be operated.

The system suggests a number of distinctive advantages.

1. A definite correlation of inside dry-bulb temperature (biased by outside temperature in an accurate manner) with inside relative humidity to give a true inside effective temperature.
2. For comfort cooling, a wide range of operation bounded by the limits of the comfort zone within which cooling is not demanded. Should however, the resultant of the three factors fall outside the comfort zone, sensible cooling and dehumidification will be called into play in the desired sequence, and for the required length of time to bring the conditions again within the limits of the comfort zone.
3. An apparent saving in operating costs, on account of wide limits of the comfort factors and the independent controlling of sensible cooling and dehumidification.
4. A simple means of adjustment for normal conditions encountered in the field.

Actual field installations are in operation with records of all factors being taken, including those of operating costs.



Send your order now for a copy of Beer Cooling Equipment Directory

SPECIFICATIONS

Data on 52 makes of draft beer dispensers and 18 makes of bottle beer coolers, including dimensions and capacities of each model, methods of cooling employed, refrigeration requirements, and parts used in the assembled units. Also a description giving a general idea of each make of cooler.

ESTIMATING

Detailed instructions covering the estimation of electric refrigeration equipment and application to beer serving and storage, prepared by engineers of Frigidaire Corp. Illustrations, diagrams, and tables accompany these technical data.

COOLING METHODS

General descriptions, with specific examples, of types of beer coolers now in use—draft and bottle coolers, portable bars, and pre-coolers. Details of Temprite, Russ, and Bishop & Babcock beer-cooling units.

BEER LAWS

A readable digest of laws governing the sale of beer today in 36 states.

BREWING

Concise, step-by-step explanations of processes involved in the manufacture of beer, given by brewmasters of the Anheuser-Busch brewery. And in addition, their suggestions as to how to serve beer properly, and how not to serve it.

DIRECTORIES

Alphabetized listings, by products, of manufacturers of draft and bottle beer coolers, beer-cooling units, beer pumps, air pressure gauges, air pressure regulators, beer faucets, beer pipe cleaners, beer taps, carbonic gas regulators, fittings, rubber pipe connections, and commercial refrigeration systems.

ADVANTAGES

A helpful summation of the advantages accruing to users of modern beer-cooling equipment, as compared with the problems and inconveniences of beer serving in pre-prohibition days.

CONTROLS

An illustrated, semi-technical digest of useful thermostatic valve hook-ups for bottle and draft beer coolers, prepared by D. D. Wile of the Detroit Lubricator Co. Facts on pressure control with modern air pumps and carbonic systems, written by R. H. Guyton, refrigeration engineer of Brunswick-Balke-Collender Co. A clear explanation of Russ Soda Fountain Co.'s new system of foam control.

SERVICE

Hints and recommendations on servicing Temprite instantaneous coolers. A digest of recommendations on the care and cleaning of coils as made by leading brewers, chemical manufacturers, and makers of beer coolers.

112 Pages. Paper cover. Single copy price 35 cents. It is FREE with a new subscription or a renewal of your present subscription to Electric Refrigeration News (\$3.00 per year) or Refrigerated Food News (\$1.00 per year) if you send cash with order.



CONTROL SPECIFICATIONS

Household Controls

GENERAL ELECTRIC

General Electric Co.
Industrial Dept., Schenectady, N. Y.

Just announced on page 10 of this issue is a new G-E control with a "wide cycle" defrosting switch which returns to normal operation automatically by means of a spring return. For complete details of this control, refer to page 10.

PENN

Penn Electric Switch Co.
2000 E. Walnut St., Des Moines, Iowa

Available with connections for either pressure or temperature control of household refrigerators, the Penn type 201 control has a single knob with which all manual adjustments are made.

Pressing the knob in starts the refrigeration system, pulling it out stops it and reveals a red band around the knob indicating that the circuit is open. In case of overload, a thermal element causes the knob to snap out to the "off" position. The overload device is trip-free—that is, the control cannot be reset or held in the "on" position until the overload element has cooled sufficiently to permit resumption of safe operation.

Turning the knob permits selection of nine different refrigerator temperatures which are numbered on the front panel. The coldest temperature is obtained by rotating the knob clockwise to point nine. The control is available with or without the overload protection, with and without the cold control adjustment, with or without the hand-operated "off-and-on" switch, and with or without the staycold (wide cycle) semi-automatic defrosting mechanism.

Control can be mounted in any position, vertical or horizontal, as the part of the control which shows outside the baffle or mounting plate is symmetrical. The control is held in place by two screws.

For starting and stopping manually a separate latching mechanism is provided which eliminates constant use of the tooth which engages the ratchet wheel of the overload device.

Electrical rating: $\frac{1}{4}$ hp. 110 or 220 volts, a.c. or d.c. Maximum voltage—250.

Ranges

For temperature control: Standard range is 0° to 40° F. adjustable. Standard differential is 8° to 20° F. adjustable. Standard outside adjuster range— $\pm 5^\circ$ F.

For pressure control: Standard range is 6 to 30 lbs. adjustable. Standard differential is 6 to 13 lbs. adjustable. Standard outside adjuster range—plus or minus 2½ lbs. Pressure connection— $\frac{1}{4}$ -in. S.A.E. male threads.

RANCO

Automatic Reclosing Circuit Breaker Co.

1304 Indianola Ave., Columbus, Ohio.

This company's new household refrigeration controls for next year's models have not yet been officially announced to the trade. Last year's models were available with a thermostatic bulb for temperature operation or a threaded connection for pressure operation.

They are offered with or without a nine-point manual temperature selector, and when desired with a defrosting position on the control dial so that the refrigerator can be defrosted on the wide cycle without permitting temperatures to rise to a dangerous point. Temperature selector is separate from the on-and-off switch on the mounting plate.

Both differential and range adjusting screws are located beneath the cover plate. Overload protection is provided with a thermal overload relay. Switch can be mounted either vertically or horizontally.

Electrical rating: $\frac{1}{2}$ hp. a.c. Maximum voltage 250.

Ranges
For temperature control: operating range is from minus 8 to plus 43° F. Minimum differential is 7° F., maximum 20° F. 20° F.

For pressure control: operating range is from 22 in. of vacuum to 30 lbs. pressure. Minimum differential is 5 lbs., maximum differential 22 lbs.

TAG SNAPON

C. J. Tagliabue Mfg. Co.

Park & Nostrand Aves., Brooklyn, N.Y.

For household refrigerators, beer coolers, water coolers, and other small commercial systems, C. J. Tagliabue Mfg. Co. offers its R-8 and R-9 "Snapon" controls with connections for either pressure or temperature operation. The R-8 control employs a toggle switch to start and stop the system, the R-9 uses a push-pull switch for this purpose.

The start-and-stop switch and eight-point temperature selector are provided on the mounting panel. Turning the temperature control to the "defrost" position raises the differential setting of the control so that the evaporator can be defrosted without losing food-preserving temperatures.

The overload relay coil at the back of the control case is accessible by removing a small cover-plate on the rear. A variety of relay coils are furnished to suit different motor sizes. Controls are available with or without relay coil.

Electrical rating: $\frac{1}{2}$ -hp. a.c. 110 or 220 volts. $\frac{1}{4}$ hp. d.c. 115 or 230 volts.

Ranges

For temperature control: Standard range 40° F. Minimum differential 6° F., maximum 25° F.

For pressure control Standard range

40° F. Minimum differential 6° F., maximum 25° F.
For pressure control: Standard range 40 lbs. Minimum differential 6 lbs., maximum 25 lbs. Pressure connections $\frac{1}{4}$ -in. S. A. E.

Commercial Controls

GENUINE DETROIT

Detroit Lubricator Co.

5842 Trumbull Ave., Detroit, Mich.

"Genuine Detroit" type 250 controls are furnished in various models for automatic control of commercial refrigeration systems according to temperature, pressure, or vacuum, and with or without a high pressure cut-out.

All models are housed in a black Bakelite case with a removable cover. Both range and differential are adjustable without removing the cover, the first by turning a screw at the end of the case, the latter by the differential adjustment on top of the case. The switch can be furnished either to make or break circuit at the high pressure point, according to requirements of the application.

Electrical circuit through the switch is made and broken by a pair of contacts which operate between the poles of a permanent magnet. These provide a quick make and break, and prevent excessive arcing. The controls will handle 10 amps. 110 volts or 5 amps. at 220 volts, a.c. or d.c.

Pressure Control

Model RB-3 for low side pressure control has a $\frac{1}{4}$ -in. pressure connection to the power element. The range is adjustable from a 20-in. vacuum to 40 lbs. pressure. Differential is adjustable from 5 to 25 lbs.

Temperature Controls

For temperature control, model RL-1 is supplied with a standard 8-ft. length of tubing and a thermostatic bulb charged with a volatile liquid. A special milk cooler model is built for milk coolers installed in unheated sheds; this model has a bulb 22 in. long, 11/16 in. o.d.

Another special switch is model RS, used for temperature control of air in refrigerators where the control is installed within the box, and where close control is not required.

Ranges

The two standard ranges for model RL-1 are from minus 30° to plus 60° F., and from 0 to 60° F., with the differentials adjustable respectively from 3 to 16° F. and from 2 to 10° F. The milk cooler type operates with a range from 0 to 60° F. and a differential from 5 to 14° F.

Dual Controls

High pressure cut-out protection is offered on two of Detroit Lubricator's controls in the 250 series. Model RIBA is a pressure control with high pressure cut-out, and model RIBL is the temperature control with the cut-out. Low side ranges and differentials are the same as corresponding models without the cut-out feature. The high side cut-out and its bellows element are mounted on top of the control.

The cut-out is furnished in two ranges. Range No. 1 is adjustable to cut out from 125 to 200 lbs., with a 20-lb. differential. Range No. 2 cuts out at any high side pressure from 70 to 130 lbs., with a differential of 20 lbs. Connection to the cut-out is made from the high side of the refrigeration unit to a $\frac{1}{4}$ -in. S.A.E. male connection on the switch.

MINNEAPOLIS

Minneapolis-Honeywell Regulator Co.
2747 Fourth Ave. S., Minneapolis

Using a mercury tube switch to open and close a circuit, Minneapolis-Honeywell controls are built for automatic temperature control of commercial refrigeration systems employing either high or low pressure refrigerants. For pressure control, Minneapolis controls are built only for low pressure refrigerants, a limitation which applies also to the controls with the high pressure cut-out feature.

Salient feature of the Minneapolis control is visible scales for both range and differential adjustments. These scales are mounted on the outside of the case, and are cross-drilled to take a standard wire and lead seal to lock an adjustment.

The operating mechanism housed in the case consists of a wide main lever with fulcrum grooves which pivot on widely spaced knife-edge supports. Integral with the main lever is the operating lever which tilts the mercury switch. The main lever is balanced by a tension main adjustment spring.

The action of the differential adjustment spring, also of the tension type, is transmitted to the main operating lever through an auxiliary lever so positioned as to impose the additional pressure necessary to increase the temperature differential.

Temperature controls are provided with bulb and capillary tubing, while the pressure controls have a connection for the high side of the refrigeration system. Controls with the high pressure cut-out (adjustable) have an additional bellows element which tilts the mercury switch to the off position when excessive pressures develop on the high side of the system.

Electrical ratings: Both temperature and pressure single-pole switch handle 1 hp. 110 volt or $\frac{1}{2}$ hp. 220 volts a.c.; and $\frac{1}{4}$ hp. 110 or 220 volt d.c. motors.

Ranges

For temperature control: Three standard ranges—first, from minus 50° to minus 10° F., second, from minus 20° to plus 20° F., and third, from 10° to 50° F. The last two ranges only are available on models with the high pressure cut-out. Ranges on the high pressure cut-out are from 110 to 150 lbs. and from 150 to 175 lbs.

For pressure control: Standard low side range from 22 in. of vacuum to 35 lbs. pressure. High pressure cut-out has three ranges, first, from 110 to 135 lbs., second, from 150 to 180 lbs., and third, from 185 to 220 lbs.

PENN

Penn Electric Switch Co.

2000 E. Walnut St., Des Moines, Iowa.

Type L Penn magnet switch is built to handle loads up to and including 1-hp. a.c. motors and $\frac{1}{2}$ -hp. d.c. motors at 110 or 220 volts. It is furnished to open and close an electric circuit with a change of pressure, vacuum, or temperature.

This control is featured by a contact construction consisting of a permanent magnet working in conjunction with an armature which in turn is actuated by means of a siphon bellows. Opening and closing of the contacts is made with a snap action produced by the magnet; all arcing is confined to the silver auxiliary contacts between the magnet poles giving the switch a magnetic blow-out.

Differential of the control is changed by a small differential adjusting screw accessible when the cover is removed. Also the range can be changed by turning the range adjusting nut in the control. For applications requiring manual temperature regulation, a cold control is provided.

Model LT is a temperature control, and can be supplied with a variety of power elements charged with a suitable volatile fluid. A change of temperature on the bulb causes a corresponding change of pressure in the power element. This is transmitted to the bellows to operate the opening and closing of the control.

Ranges

An assortment of models can be furnished with ranges from -20° to 250° F. Differential can be set for a minimum of 2° F. to a maximum of 15° F., with special differentials from 8 to 25° F.

Model LP, a Pressure Control

Model LP Penn control is the same as model LT, except that a pressure connection is furnished instead of the power element charged with a volatile liquid. This is available in a $\frac{1}{4}$ -in. S. A. E. male connection, or $\frac{1}{8}$ or $\frac{1}{2}$ -in. pipe connection. Adjustments are same as in model LT.

Ranges

The range can be set to operate from a 20-in vacuum to a 30-lb. pressure, with special ranges from 5 to 60 lbs., 40 to 175 lbs., and 75 lbs. to 225 lbs.

Standard minimum differential is 1 lb. and maximum 14 lbs. One special differential is from 5 to 25 lbs., and others can be supplied.

Dual Control

High pressure cut-outs are furnished with either temperature or pressure controls for commercial refrigeration systems. This consists of a second bellows element (on opposite side from the control bellows) which is connected to the high side pressure of the refrigerating system. Should an excessive pressure develop in the system, it will be imposed on the bellows and cause the cut-out to shut down the system.

This safety mechanism is supplied to cut out at any desired pressure up to 185 lbs. Its differential between stopping and starting points varies from approximately 15 lbs. at low settings to about 40 lbs. at high settings. It operates with complete independence from the control mechanism, and allows the machine to re-start when high pressure condition is removed.

TAG SNAPON

C. J. Tagliabue Mfg. Co.

Park & Nostrand Aves., Brooklyn, N.Y.

Built in a black japanned steel case, Tag R-7 "Snapon" controls are regularly furnished with an external temperature adjustment and dial for manual regulation of commercial refrigeration systems. When desired the adjustment can be confined to the inside of the case and the cover sealed.

This instrument is offered in models with either temperature and pressure control connections, and either to make contact at a high temperature or pressure, or to make contact at a low temperature or pressure. These switches are rated to handle $\frac{1}{2}$ -hp. 110 and 220 volts a.c., or 1-hp. 110 and $\frac{1}{2}$ -hp. 220 volts d.c. without a relay.

The differential is adjusted by a slotted adjusting nut inside the case.

Ranges

For temperature control: Total range 40° F. within limits of minus 30° F. to 450° F. Minimum differential is 4° F., maximum is 25° F.

For pressure control: Total range 40

lbs. within limits of zero to 200 lbs. Minimum differential is 10 lbs., maximum is 40 lbs. Pressure connection $\frac{1}{4}$ -in. S. A. E.

With High Pressure Cut-Out

CS models in the Tag "Snapon" line of commercial controls are provided with a high pressure cut-out, and are manufactured in a slightly larger case to accommodate the additional bellows and mechanism. Range of the high pressure cut-out is adjustable by an external set screw which varies the tension of the spring working against the bellows of the cut-out. Electrical ratings are the same as for model R controls.

Room Thermostats

GENUINE DETROIT

Detroit Lubricator Co.

5842 Trumbull Ave., Detroit, Mich.

To control heating and cooling apparatus for air-conditioning apparatus used in winter and summer, Detroit Lubricator builds model 445 thermostat for mounting in the conditioned space. This instrument employs two bi-metallic thermostatic elements which actuate contacts operating in conjunction with permanent magnets to produce a positive make and break.

It is a low-voltage instrument, handling up to 25 volts. Maximum load carried is 25 watts.

Both heating and cooling control mechanisms in the control have adjusting wheels, both for a range from 55 to 85° F. The heating mechanism makes circuit on a decrease in temperature, the cooling device making circuit on an increase in temperature. A Tycos indicating thermometer is mounted on the case.

MINNEAPOLIS

Minneapolis-Honeywell Regulator Co.
2747 Fourth Ave. S., Minneapolis

For control of refrigeration equipment according to air temperatures, Minneapolis-Honeywell manufactures its type 149 Air-switch, a thermostat with a bi-metallic spiral element which is sensitive to the air temperature of the room in which it is installed. The thermostatic element tilts a mercury tube switch to open and close the electrical circuit.

The switch will control $\frac{1}{2}$ -hp. repulsion-induction motors, $\frac{1}{4}$ -hp. split-phase motors, or $\frac{1}{8}$ -hp. d.c. motors at voltages up to 250. It closes the circuit on a temperature rise, the standard scale range being from 15° to 95° F. The operating differential is adjustable from 3° to 8° F., the maximum rate of change being 1° in 3 minutes.

A pointer, connected to the switch tilting mechanism, extends through the front of the case so that the control is manually adjustable over the range of the scale. The pointer may be locked in position at any point to prevent tampering.

PENN

Penn Electric Switch Co.

2000 E. Walnut St., Des Moines, Iowa.

Penn's type BR and type 801 thermostats for refrigeration service are used to maintain constant air temperatures in walk-in coolers, air-conditioned rooms, etc. They employ a coil of bi-metallic metal to actuate a mechanism which closes the electrical circuit at high temperature and opens it at low temperatures.

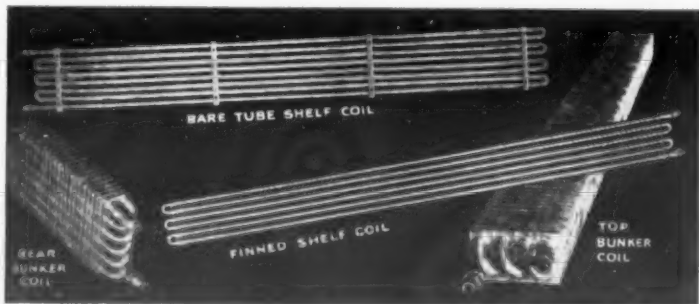
The instrument utilizes silver contacts between the poles of a permanent magnet to make and break the circuit. The mechanism is mounted on a bakelite base with an adjusting lever extending below the case to a graduated scale. Mounted on the case is a Tycos indicating thermometer.

Electrical ratings: Type 801 will handle a maximum of 250 volts. It will control a $\frac{1}{4}$ -hp. split-phase or $\frac{1}{2}$ -hp. repulsion-induction motor. Type BR thermostat will handle 250 volts or 550 volts on pilot service. It will control $\frac{1}{2}$ -hp. single-phase a.c. or $\frac{1}{4}$ -hp. d.c. motors.

Ranges

Standard ranges on type 801 are 20 to 50° F., 25 to 55° F., 30 to 60° F., 35 to 65° F., and 40 to 70° F. Standard ranges on the type BR switch are 30 to 50° F., 20 to 40° F., 25 to 45° F., and 35 to 55° F. Standard differentials are 2° F. minimum, and 6° F. maximum on both thermostats.

Kramer Announces "Shelf" Evaporators

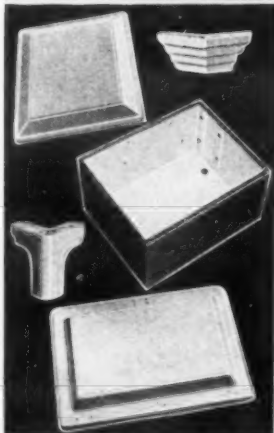


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WOLVERINE

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MOTOR SPECIFICATIONS

BALDOR

Baldor Electric Co.
4353 Duncan Ave., St. Louis, Mo.

Capacitor Type

Sizes: $\frac{1}{4}$, $\frac{1}{2}$, and $\frac{3}{4}$ hp., 110 volts, 60 cycle a.c.

Construction: Splash-proof frame, spring cushioned mounting. Terminal box and condenser combined in base of motor. Rolled steel frame. Rotor balanced magnetically and dynamically. Bronze ventilated bearings, served from wool-packed oil wells. Rotation reversible.

Performance claims: High torque characteristics, quiet operation, good power factor, low starting current and losses. Long-hour performance meets Nema and N.E.L.A. standards.

CENTURY

Century Electric Co.
1806 Pine St., St. Louis, Mo.

Brush-Lifting, Repulsion-Induction, Single-Phase Type

Sizes: $\frac{1}{4}$ to 40 hp., 110 or 220 volts, standard speeds and frequencies.

Construction: Bearings and lubrication—1 $\frac{1}{2}$ hp. and smaller, bronze bearings, wool yarn system of lubrication; 2 hp. and larger, bronze bearings, ring oilers. Grease lubricated ball bearings available. Mounting—rigid, cushion, vertical, or flange.

Performance claims: Maximum starting current does not exceed 260 per cent of full load current. Starting torque—varies from 250 to 350 per cent of full load torque, depending on speed and frequency.

Capacitor-Start, Induction Motors, Single-Phase

Sizes: $\frac{1}{4}$ to $\frac{3}{4}$ hp., 110 or 220 volts, standard speeds and frequencies.

Construction: Bearings and lubrication—phosphor bronze bearings with wool yarn system of lubrication on $\frac{1}{2}$ hp. and smaller; 2 hp. and larger, bronze bearings, ring oilers. Grease lubricated ball bearings are available. Mounting—rigid, cushion, vertical, or flange. Armature and field for capacitor motors can be supplied for sealed-in units.

Performance claims: Starting torque varies from 250 to 400 per cent of full load torque, depending on speed and frequency. Starting current within N.E.L.A. limits.

Direct Current Type

Sizes: $\frac{1}{4}$ to 150 hp., 32, 115, and 230 volts, standard speeds.

Construction: Bearings and lubrication—phosphor bronze bearings with the Century wool yarn system of lubrication on 1 hp. and smaller motors; phosphor bronze bearings with ring oilers on the larger sizes. Grease lubricated ball bearings are available. Mounting—rigid, cushion, vertical, or flange.

Performance claims: Maximum starting current for small motors varies from 415 to 750 per cent, depending on speed; larger motors with current limiting starting equipment limited by commutation. The minimum torque for small motors, not less than 350 per cent of full load torque; larger motors with current limiting starting equipment limited by commutation.

Split-Phase for Sealed-In Units

Sizes: $\frac{1}{4}$ and $\frac{1}{2}$ hp., standard speeds and frequencies (supplied with armature and field without bearing brackets).

Performance claims: Starting current within N.E.L.A. limits. Starting torque—160 per cent of full load torque.

DELCO

Delco Products Corp.
329 E. First St., Dayton, Ohio

Repulsion-Induction, Condenser-Transformer, and Condenser-Start Types

Sizes: $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, 1, 1 $\frac{1}{2}$, and 2 hp.

Construction: Automatic end play take-up, low noise level, vulcanized rubber cushion mounting allowing rotative flexibility, patented non-spillable end heads or sealed lubrication, and high starting and accelerating torques.

Following is a tabulation of the characteristics of the various motors:

Delco Motors		Starting Torque	Pull-out Torque	Pull-in Torque	Power Factor	Efficiency	Amps.
$\frac{1}{4}$ hp.	C.T.	400%	300%	300%	80	62	15.5
	C.S.	450%	250%	250%	64	62	14.0
	R.I.	450%	225%	200%	60	60	9.0
$\frac{1}{2}$ hp.	C.T.	415%	313%	313%	80	65	17.0
	C.S.	415%	250%	250%	65	64	17.0
	R.I.	450%	225%	200%	60	64	10.0
$\frac{3}{4}$ hp.	C.T.	433%	283%	283%	80	66	19
	C.S.	400%	250%	250%	67	66	19
	R.I.	450%	225%	200%	64	66	13
$1\frac{1}{2}$ hp.	R.I.	450%	225%	200%	67	67	18
	R.I.	450%	225%	200%	68	69	....
	R.I.	450%	225%	200%	70	70	....
1 hp.	R.I.	450%	225%	200%	72	76	....
1 $\frac{1}{2}$ hp.	R.I.	450%	225%	200%	76	76	....
2 hp.	R.I.	450%	225%	200%	74	78	....

Performance claims: High starting and accelerating torque, quietness, good operating characteristics, and ability to withstand heavy overloads for short periods.

In general the d.c. motors have higher efficiencies than the above a.c. motors for equivalent ratings. They are also equipped with condensers for radio interference elimination which is very necessary for

EMERSON

Emerson Electric Mfg. Co.
2018 Washington Ave., St. Louis, Mo.

Capacitor-Start, Induction-Run Type

Sizes: $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, and $\frac{1}{2}$ hp., 110 volts alternating current.

Construction: Steel box with condenser and outlets mounted on top of motor. Laminated steel stator assembled under pressure with a field ring welded around laminations; rotor also of laminated punchings, held together by copper conductors, and pressed on motor shaft under hydraulic pressure. Bearings of special alloy with grooves to distribute oil over bearing surfaces. Wool-packed oil reservoir with sufficient lubricant for a year's operation, cotton wick leads oil to bearings by capillary attraction. Furnished with resilient or rigid base mountings.

Design: The stator or field has a main and auxiliary or phase winding with the condenser connected in series. Starting accomplished by condenser principle; when speed is attained, a snap-break type cut-out opens the phase winding, removing condenser from circuit, and motor operates on main winding as a standard induction type.

Performance claims: High blocked or starting torque (350 to 500 per cent of full load torque); low starting current; quiet operation; high overload capacity (up to 250 per cent of full load torque); and good power factor.

GENERAL ELECTRIC

General Electric Co.
Industrial Dept., Schenectady, N. Y.

Capacitor-Start and Capacitor-Start-and-Run Types

Construction: Capacitor mounted on top of motor. Resilient mounting. Drip-proof construction. Built-in terminal board. Direction reversed by interchanging motor leads. Wool-packed bearings sealed against leakage. Welded rolled steel stators, cast rotors.

Performance claims: Good running characteristics and reserve capacity. Liberal starting and accelerating torques. Quiet operation, and minimum of radio interference.

For further details about G-E capacitor motors, see article by G. E. Cassidy of General Electric Co. on page 9 of this issue.

HOWELL

Howell Electric Motors Co.
Howell, Mich.

Capacitor Type

Howell refrigeration motors are distinguished by the capacitor which has been built into the motor frame without adding to its general overall dimensions. Another feature is interchangeability of voltages (110 and 220) by simply reversing four leads in the terminal box.

Construction: The motor frame is of splash-proof construction. Mountings are in rubber for refrigeration service, and rigid or vertical for special applications.

Performance claims: Starting torque from 250 to 500 per cent of normal running torque. High power factor and efficiency. Quiet operation and elimination of radio interference.

LELAND

Leland Electric Co.
1501 Webster St., Dayton, Ohio

Repulsion-Induction Type

Sizes: $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, and $\frac{1}{2}$ hp., 60 cycle a.c.; $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, and $\frac{1}{2}$ hp., 50 cycle a.c.; and $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, and $\frac{1}{2}$ hp., 25 cycle a. c. all available in both 110 and 220 volt models.

Construction: Cushioned cradle or rigid mountings available, the latter with either foot construction or separable base. Sleeve type bearings.

Direct Current Motors

Sizes: $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, and $\frac{1}{2}$ hp. each in 32, 115, or 230 volts.

Construction: Same mountings and bearings as repulsion-induction motors.

Delco Motors		Starting Torque	Pull-out Torque	Pull-in Torque	Power Factor	Efficiency	Amps.
$\frac{1}{4}$ hp.	C.T.	400%	300%	300%	80	62	15.5
	C.S.	450%	250%	250%	64	62	14.0
	R.I.	450%	225%	200%	60	60	9.0
$\frac{1}{2}$ hp.	C.T.	415%	313%	313%	80	65	17.0
	C.S.	415%	250%	250%	65	64	17.0
	R.I.	450%	225%	200%	60	64	10.0
$\frac{3}{4}$ hp.	C.T.	433%	283%	283%	80	66	19
	C.S.	400%	250%	250%	67	66	19
	R.I.	450%	225%	200%	64	66	13
$1\frac{1}{2}$ hp.	R.I.	450%	225%	200%	67	67	18
	R.I.	450%	225%	200%	68	69	....
	R.I.	450%	225%	200%	70	70	....
1 hp.	R.I.	450%	225%	200%	72	76	....
1 $\frac{1}{2}$ hp.	R.I.	450%	225%	200%	76	76	....
2 hp.	R.I.	450%	225%	200%	74	78	....

electric refrigeration operation.

Delco Motors for Sealed Compressors

On enclosed units condenser-transformer, condenser-start, and split-phase motors are used. The characteristics for enclosed unit motors are so varied because these motors are special that no figures are given.

MASTER

Master Electric Co.
100 David Ave., Dayton, Ohio

Repulsion-Induction Type

Sizes: $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, and $\frac{1}{2}$ hp. for 25, 50, and 60 cycle a.c. Also compound motors for d.c.

Construction: Furnished with either rigid or rubber-mounted three-point suspension cradle base—applying the "floating power" principle to electric motor mountings, reducing starting shock stresses and providing smooth operation. Available for either clockwise or counter-clockwise rotation.

Capacitor Type

Sizes: $\frac{1}{4}$, $\frac{1}{2}$, and $\frac{3}{4}$ hp. for 50 and 60 cycle single-phase 110 or 220 volts a.c.

Construction: Condenser can be furnished for separate mounting, or on top of motor. Available for operation in either direction.

Performance claims: High torque and efficiency, long hour duty, temperature rise less than 40° C., and high power factor.

WAGNER

Wagner Electric Corp.
6400 Plymouth Ave., St. Louis, Mo.

Types

Capacitor-start $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$, & 1 hp.
Capacitor-start-and-run $\frac{1}{4}$ to 1 hp., incl.
Repulsion-start-induction-run $\frac{1}{4}$ to 15 hp.
Repulsion-induction 1 hp. and up

New features embodied in some or all of the above motors include: resilient mounting (either spring or rubber); large-capacity oil-wells; automatic belt-tightener; and terminal-board in conduit-box.

A review of features Wagner has advertised regarding its four types of single-phase motors listed above, include the following:

The capacitor-start (see wiring diagram for connections) starts as a condenser motor and runs as an induction motor, accomplished by means of a quiet-operating very-quick-break switch liberally designed, capable of frequent actuation over many years of service.

Construction: Neatly-designed conduit-box equipped with terminal-board with connections for thermostatic control of starting and stopping. Designed electrically for quiet operation. Supplied either resilient or rigid mounted; resilient mounting either rubber or spring. Spring-thrust washers on the shaft to take end-thrust of rotor, and prevent noise. Can be equipped with large-capacity non-spillable oil-well.

The capacitor-start-and-capacitor-run (see wiring diagram for connections) has all the above features listed under Capacitor-Start, except that capacitor is allowed to remain in the circuit during the entire operating period, which results in improved operating power factor.

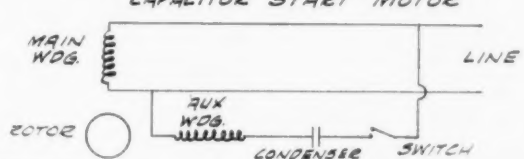
The repulsion-start-induction (see wiring diagram for connections) has all features listed under capacitor-start motor, except the first. As the name indicates, this type of motor starts as a repulsion motor, pre-determined rotor circuits effected by means of commutator and brushes. At a pre-determined speed, a governor mechanism short-circuits the rotor windings, lifts the brushes, and the motor then operates as an induction motor.

The repulsion-induction has the following performance claims:

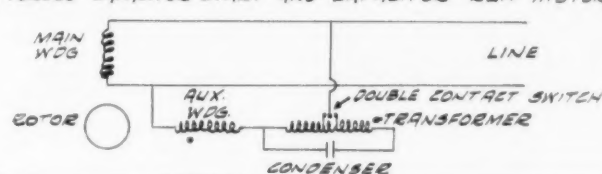
1. Exceptional torque characteristics; a smooth speed-torque curve, without abrupt

Motor Wiring Diagrams

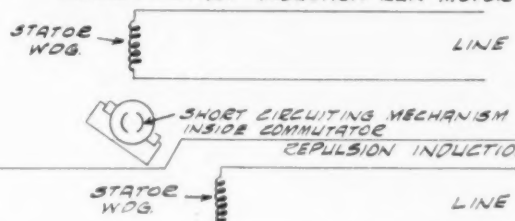
CAPACITOR START MOTOR



HIGH-TORQUE CAPACITOR START AND CAPACITOR RUN MOTOR



REPULSION START-INDUCTION RUN MOTOR



Wiring diagrams of capacitor-start, capacitor-start-and-capacitor-run, repulsion-start-induction-run, and repulsion-induction refrigeration motors furnished by Wagner Electric Co. See specifications at left.

fluctuations, throughout the entire operating range—well adapted for severe starting duty.

2. Low starting-current.
3. Close speed-regulation.
4. Positive operation on low voltage.
5. High efficiency.
6. Good power-factor.
7. Good commutation; long brush-life.
8. No internal short-circuiting or brush-lifting mechanism.

WESTINGHOUSE

Westinghouse Electric & Mfg. Co.
East Springfield, Mass.

Two-value capacitor; capacitor-start; split-phase; repulsion-induction; and direct current motors.

Sizes: for all commercial voltages and frequencies.

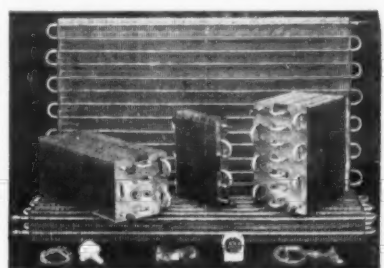
Chief feature of the Westinghouse refrigeration motors is the provision of thermal overload protection with a thermostatic disc mounted on the motor to break the circuit on overheating (for further details see article on page 8 of this issue).

Construction: Capacitors are motor-mounted or furnished for separate mounting. Mountings are interchangeable for motors of the same rating. A special bearing construction is provided to eliminate end bump. Steel frames up to and including $\frac{3}{4}$ hp., cast-iron frames above $\frac{3}{4}$ hp. Diamond-bored sleeve bearings or ball bearings. Sleeve bearings wool packed with oil return at each end. Ball bearings grease lubricated. Mountings available are

rigid, resilient, or special.

Motors for Fan Service

Capacitor and shaded-pole motors are built by Westinghouse for cooling fans and for air circulation.



Coils with a new meaning of Efficiency

REMPE SUPER COLD FIN COILS

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Nationwide Coverage

with branch sales offices, motor warehouses, and service stations

Assures Quick Service

when a replacal motor or a motor-part is urgently needed

You realize the importance of quick service when a replacal motor or a repair part is needed. So does Wagner—hence, 25 branch offices, warehouses and service stations in all parts of the country. Each service station has a complete stock of motor-parts, available for immediate shipment.

Your customers expect uninterrupted refrigeration, and immediate repairs or replacals when trouble develops. Wagner's nationwide coverage is your assurance that your customers need not be disappointed.

When there's trouble with any make of motor, or any information wanted on motors, get in touch with Wagner's nearest branch.



Illustrations: the plant of the Wagner Electric Corporation at St. Louis—and the location of Wagner's 25 branch offices, service stations, and motor warehouses.

Wagner Electric Corporation

6400 Plymouth Avenue, Saint Louis, U.S.A.

MOTORS

TRANSFORMERS

FANS

BRAKES

M233-2

PATENTS

ISSUED SEPT. 26, 1933

1,927,852. HUMIDIFYING UNIT FOR COLD STORAGE COMPARTMENTS. Thomas G. Shawhan, Kansas City, Kan. Application May 12, 1932. Serial No. 610,857. 2 Claims. (Cl. 261-12.)

1. In a portable, cold-storage, humidifying unit, the combination including a movable support, a reservoir mounted on said support, a housing secured to said reservoir, said housing being provided with an opening, a blower fan mounted in said opening, an air duct communicating with said housing, a water spray positioned in said air duct, a pump adapted to circulate water from said reservoir to said spray, an adjustable cowl removably secured to said air duct, a baffle plate in said cowl, and means for automatically keeping the water in the reservoir above the freezing point.

1,927,869. AIR CONDITIONING AND CIRCULATING UNIT. Sewell H. Downs, Kalamazoo, Mich. Application May 2, 1932. Serial No. 608,766. 18 Claims. (Cl. 183-23.)

1. In a unit air conditioner and circulator, the combination of a casing, a heat exchange element spaced from two walls of said casing to form by-passes, flanges on said element adjacent said by-passes, and means for controlling the flow of air through said by-passes and said heat exchange element comprising a pair of dampers having curved blades on pivoted supports having counter-weights adapted to close said by-passes, a centrally disposed damper adapted to partially close off said element, and flanges on said curved blades adapted in one position to engage said first mentioned flange and in another position to engage the blade of said centrally disposed damper, links connecting said dampers for simultaneous movement, and means for operating said dampers.

1,927,879. INSULATION SLAB. Allen L. Spafford, Cloquet, Minn., assignor to Wood Conversion Co., Cloquet, Minn., a Corporation of Delaware. Application Nov. 16, 1931. Serial No. 575,171. 6 Claims. (Cl. 154-44.)

1. An insulation unit in the form of a package of predetermined form comprising a closed containing wrapper of sheet material, a filler of packed bulk fibers, and

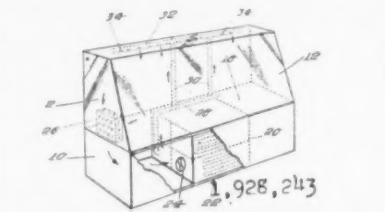
reinforcing means at an edge defined by adjacent faces of the package, said means being interposed between the fiber and the wrapper.

1,928,212. REFRIGERATOR. Aage B. Salto, New York, N. Y., assignor to Rex Cole, Inc., New York, N. Y., a Corporation of New York. Application July 21, 1931. Serial No. 552,219. 7 Claims. (Cl. 62-1.)

6. A refrigerator employing sulphur dioxide as a refrigerant and means to prevent the escape of such refrigerant to the surrounding air comprising an enclosing casing containing partially dehydrated aluminum trihydrate.

1,928,239. REFRIGERATOR. Adelard Amyot, Montreal, Quebec, Canada. Application March 15, 1933. Serial No. 660,836. 2 Claims. (Cl. 62-37.2.)

1. In a refrigerating display case, means for circulating and dehumidifying the con-



tained air, said means including a refrigerating chamber, a plurality of cooling coils in the chamber, and a suction fan for passing the air over the coils, together with a trapped drain in the lower portion of the refrigerating chamber, and means for conveying chilled dehumidified air to the upper portion of the case, said means comprising a system of pipes leading from the refrigerating chamber to the upper portion of the display case, together with a ventilator in one side of the display portion of the case for delivering air therefrom to the lower portion of the case and the refrigerating coils.

1,928,300. MOTOR-PUMP UNIT. Frank D. Peltier, Evansville, Ind., assignor, by mesne assignments, to Servel, Inc., New York, N. Y., a Corporation of Delaware. Application July 17, 1930. Serial No. 468,679. 8 Claims. (Cl. 230-207.)

1. A rotary compressor having slidable

blades forming pump chambers, means for supplying lubricant under pressure behind the blades only at the point of maximum displacement of the chambers, said blades having their leading faces grooved whereby lubricant will be forced from the space behind the blades through said grooved portions into the displacement area of the compressor.

1,928,331. CONDITIONING AND VENTILATING SYSTEM. Sewell H. Downs, Kalamazoo, Mich., assignor to Clarge Fan Co., Kalamazoo, Mich. Application Feb. 10, 1933. Serial No. 656,163. 4 Claims. (Cl. 257-8.)

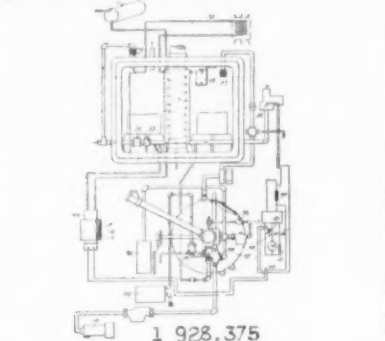
1. In an apparatus of the class described, the combination of a room to be conditioned, an air conditioner, a constant speed centrifugal fan having a rotatable fan wheel, a re-circulation duct leading from said room to said fan, a return duct leading from said room to said conditioner, an outside duct leading from a source of unconditioned air to said fan, a duct from said conditioner to said fan, a volume control for said fan comprising a plurality of blades adapted to close off the air or in open position to impart to air entering the fan a swirl in the direction of rotation of the fan wheel, a duct from said fan to said room, a filter in said outside duct, a damper adapted to close off said outside duct, means for controlling the condition imparted by the conditioner to the air passing therethrough under control of the conditions in said room and means to control said volume control means under control of the conditions in said room comprising a thermostat.

1,928,332. CONDITIONING SYSTEM. Sewell H. Downs, Kalamazoo, Mich., assignor to Clarge Fan Co., Kalamazoo, Mich. Application Feb. 23, 1933. Serial No. 658,025. 7 Claims. (Cl. 257-8.)

4. In an apparatus of the class described, the combination of a room to be conditioned, an air conditioner, a constant speed centrifugal fan having a rotatable fan wheel, a volume control for said fan comprising a plurality of blades adapted when in open position to impart to air entering said fan a swirl in the direction of rotation of the fan wheel, and means under control of conditions in the room for controlling said volume control means, and means to conduct air from said fan to said room.

1,928,375. COOLING SYSTEM FOR PASSENGER VEHICLES. Carter F. Hall, Baltimore, Md. Application Oct. 6, 1930. Serial No. 486,784. 21 Claims. (Cl. 68-128.)

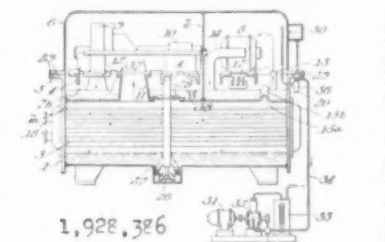
21. In a system of conditioning, cooling, and distributing air, and cooling drinking



water for passenger vehicles, a liquid supply means carried by the vehicle associated with the system, means for conditioning and means for cooling the air, and means associated with the air cooling means for cooling drinking water, the system having equal air circulating means in the sphere of the space to be occupied by the passengers.

1,928,386. REFRIGERATING APPARATUS. Adolf Meyer, Kunsnacht, near Zurich, Switzerland, assignor to Aktiengesellschaft Brown, Boveri & Cie, Baden, Switzerland, a joint-stock company. Application Nov. 22, 1932. Serial No. 643,915, and in Germany Dec. 24, 1931. 15 Claims. (Cl. 62-115.)

1. A completely enclosed refrigerating apparatus including a motor-compressor assembly, a condenser and an evaporator,



a casing providing a container for said evaporator and condenser, a plurality of transverse stiffening members positioned in the upper portion of said casing and cooperating therewith to provide a rigid base for said motor-compressor assembly, a dome adapted to be fastened to the top of said casing and to enclose said motor-compressor assembly, and partitions dividing the space enclosed within said casing and dome into chambers separately enclosing the evaporator, the condenser, the compressor, and the motor.

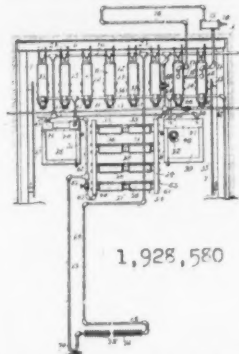
1,928,467. REFRIGERATING APPARATUS. Frederic L. Tarleton, Springfield, Mass., assignor to Westinghouse Electric & Mfg. Co., a Corporation of Pennsylvania. Application Jan. 21, 1932. Serial No. 587,973. 7 Claims. (Cl. 62-126.)

5. In a refrigerant containing evaporator for refrigerators, the combination of an upper header, corrugated welded walls depending from the upper header, said corrugations forming passageways opening into the header, a second header located below the upper header and connecting the lower ends of substantially all of the passageways, and an inlet conduit for conveying liquid refrigerant to the evaporator, said inlet conduit extending into one of said passageways for conveying refrigerant fluid to the lower header and, therefore, to the lower ends of substantially all of the passageways, whereby the refrigerant fluid is circulated downwardly through one of the passageways and up-

wardly, in multiple, through a plurality of the passageways.

1,928,580. APPARATUS FOR COOLING. Douglas K. Warner, Bristol, Conn. Application May 15, 1928. Serial No. 277,931. 7 Claims. (Cl. 62-95.)

1. A cooling apparatus comprising a cooling unit for maintaining a room at a



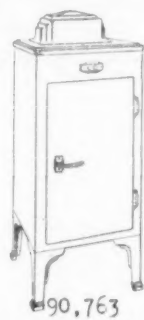
constant temperature and including an evaporating refrigerant container, a pipe leading from the refrigerant container, a second and lower evaporating element connected with the pipe, and means for returning the evaporated refrigerant from the lower evaporating element to the container.

1,928,594. ICE CUBE CARRIER. George F. Kearney, New York, N. Y., assignor of one half to Edward Maynard Reilly, New Rochelle, N. Y. Application Oct. 14, 1932. Serial No. 637,694. 10 Claims. (Cl. 62-5.)

1. An ice cube carrier comprising a frame having a plurality of tiers of shelves with obstacles forming discrete cube-holding pockets, said shelves being provided with self-draining outlets and a water tray beneath the pockets.

DESIGNS

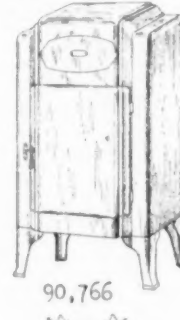
90,763. DESIGN FOR A REFRIGERATOR CABINET. Joseph W. Gosling, Schenectady, N. Y., assignor to General



Electric Co., a Corporation of New York. Application July 27, 1933. Serial No. 48,549. Term of patent 14 years.

The ornamental design for a refrigerator cabinet substantially as shown.

90,766. DESIGN FOR A REFRIGERATOR CABINET. Walter Parks Gray, Cincinnati, Ohio, assignor to The Crosley



Radio Corp., Cincinnati, Ohio, a Corporation of Ohio. Application March 23, 1933. Serial No. 47,556. Term of patent 7 years.

The ornamental design for a refrigerator cabinet as shown.

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, ETC., REQUIRED BY THE ACT OF CONGRESS OF AUGUST 24, 1912

Of Electric Refrigeration News published weekly at Detroit, Mich., for Oct. 1, 1933.

STATE OF MICHIGAN

COUNTY OF WAYNE—ss.

Before me, a Notary Public in and for the State and county aforesaid, personally appeared George N. Congdon, who, having been duly sworn according to law, deposes and says that he is the Business Manager of the Electric Refrigeration News and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management (and if a daily paper, the circulation), etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, embodied in section 411, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and

business managers are:
Publisher: F. M. Cockrell, Detroit, Mich.
Editor: Geo. F. Taubeneck, Detroit, Mich.
Business Managers: Geo. N. Congdon, Detroit, Mich.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding one per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.)
Business News Publishing Company, Detroit, Mich.
F. M. Cockrell, Detroit, Mich.

3. That the known bondholders, mortgages, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.)
None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholders or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the six months preceding the date shown above is.....

(This information is required from daily publications only.)

GEO. N. CONGDON,
Business manager.

Sworn to and subscribed before me this 29th day of September, 1933.

SEAL ROBERT L. ANDERSON,
(My commission expires July 27, 1934.)

IF YOU HAVE A RUBBER PROBLEM MILLER WILL FIND YOU THE RIGHT ANSWER

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CONFIDENTIAL SERVICE ON RUBBER PARTS

THE technical staff maintained by Miller exclusively for the service of the refrigeration industry, has worked closely with every important manufacturer of refrigerators since the birth of the business.

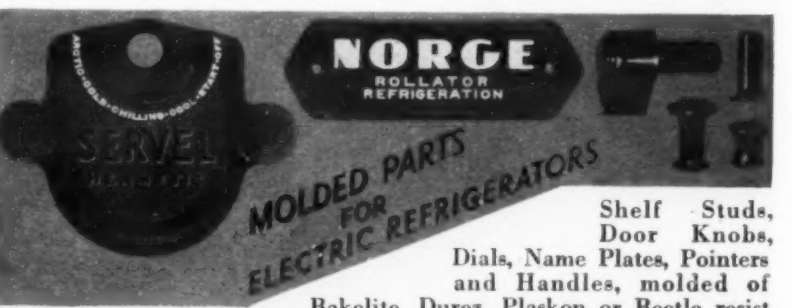
Developing special compounds for specific qualities, suggesting improvements in their design, spotting possible economies—these are daily routine with us. The strictest professional respect for confidential data is one of the reasons why Miller service is appreciated.

If you seek a rubber compound free from odor, that is oil-resisting, grease-resisting, and even age-resisting—or if you have a peculiar problem in design of a rubber part—let Miller do your worrying for you. If we have not already a formula or a blueprint that answers the purpose, we will find one.

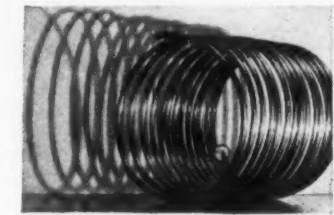
MILLER KNOWS REFRIGERATION PROBLEMS

Miller

MILLER RUBBER PRODUCTS CO., Inc., AKRON, O.

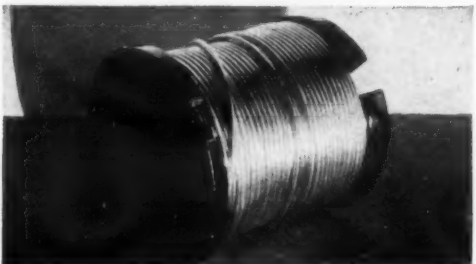


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Coil of 60 ft.

Reel of 425 ft.



FRENCH TUBES

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LONG LENGTHS

A NEWLY developed process makes possible the production of French Seamless Copper Refrigeration Tubes as large as one-half inch in diameter, in lengths up to 200 feet. Smaller tubes are available in even longer lengths. For instance, the one-quarter inch tube illustrated is 425 feet long.

These new long lengths materially reduce the risk of failure by minimizing splices. Also the longer lengths reduce scrap losses, as the exact amount required can be cut without waste at the ends.

French De Luxe Copper Refrigeration Tubes are free from oxide and foreign matter. Each coil is completely dehydrated, sealed, rigidly tested and reaches you ready for use. For manufacturers who prefer to do their own dehydrating, the French Manufacturing Company produces copper tubes dried (commercially dehydrated) with either open or closed ends.

All French Copper Refrigeration Tubes possess the requisite properties for lasting, dependable service. Their grain structure is uniform. These important qualities are in every coil because metallurgical skill, long manufacturing experience and only the best of raw material go into their production. Additional information will be furnished upon request.



THE FRENCH MANUFACTURING CO.
General Offices: Waterbury, Connecticut

FRENCH REFRIGERATION TUBES

BUYER'S GUIDE

MANUFACTURERS SPECIALIZING IN SERVICE
TO THE REFRIGERATION INDUSTRY

"RAPIER-LIKE"

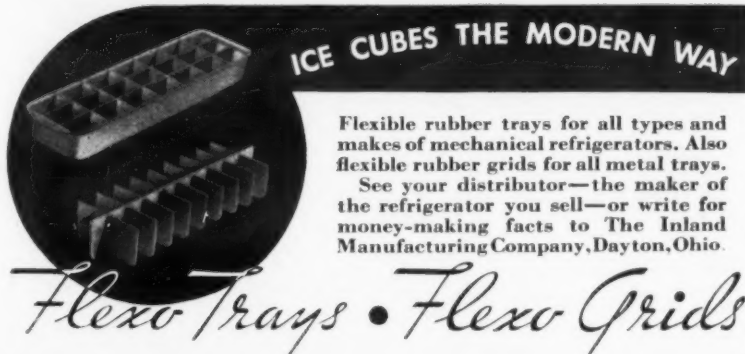
That describes the quick thrust and withdrawal of heat when a PEERLESS FIN COIL is used.

Because the coil is constructed of aluminum fins, with no heavy, solder-encrusted return bends—there is no MASS of metal to cool before cooling the box—and no MASS of metal to warm up before fins can defrost.

**Quick Cooling — Quick Defrosting — that is why
PEERLESS FIN COILS**
are uniformly successful in all sections of the country.

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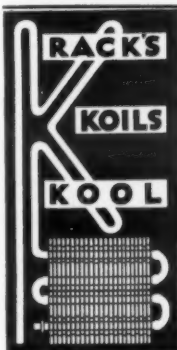
Flexible rubber trays for all types and makes of mechanical refrigerators. Also flexible rubber grids for all metal trays. See your distributor—the maker of the refrigerator you sell—or write for money-making facts to The Inland Manufacturing Company, Dayton, Ohio.

Dayton V-Belts

For all makes and types of refrigerators. There is a stock near you. Ask for price list and name of your nearest distributor.

THE DAYTON RUBBER MFG. CO.
Dayton, Ohio

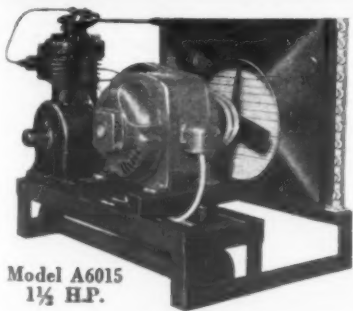
The World's Largest Manufacturer of V-Belts



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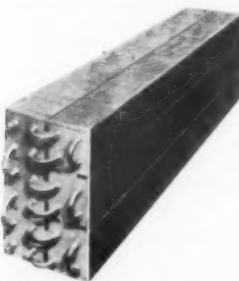


PARKER MANUFACTURING CO.

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UNITS—1-6 to 5 H.P.
AMMONIA - METHYL
SO² - FREON

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Complete listing of Commercial Evaporators
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Evaporators, Condensers, Shelf-Coils, with fins or bare.

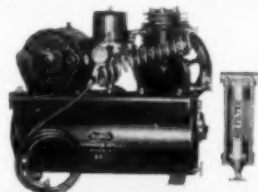
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BRUNNER BEER PUMPS are Sanitary, Compact, Noiseless and Complete



Model 8B3

Write for Information

BRUNNER MANUFACTURING CO.
UTICA, N.Y.

One of a complete line of five Brunner
models with capacities of from three
to twenty kegs. Price \$76.50. Less
Filter \$69.50.

QUESTIONS

Copeland Service

No. 1388 (Distributor, Florida)—
"Kindly advise us where we can get
information on how to repair Copeland
domestic and commercial refrigeration
controls. There must be some way we
can get information on repairing our
own controls. We are willing to pay,
within reason, for the opportunity to
learn."

Answer—The Copeland company is
still providing service on machines in
the field, and expects to get into
regular production under the new or-
ganization soon. Direct your inquiry
to Copeland Products, Inc., Mt. Cle-
ments, Mich.

Refrigerant Chart

No. 1389 (Service man, New Jersey)
—In the Sept. 13 issue you described
a new chart designed by A. A. Mc-
Cormack of Dayton, Ohio, to deter-
mine the pressure-temperature rela-
tionships of the various refrigerants.
Would you be kind enough to give me
Mr. McCormack's mailing address so
I can order two of these charts?"

Answer—2305 Emerson Ave., Day-
ton, Ohio.

Consumers' Research

No. 1390 (Distributor, New York)—
"About one year ago in one of your
issues you published a statement about
the relationship between Consumers'
Research and the trade, stating your
opinion as to its relative value."

"As we are continually running up
against quotations made by Consumers'
Research in this territory, we would
appreciate receiving a copy of this
article, and any further information
you may have about this organization."

Answer—The article to which you
refer was published in the May 18,
1932, issue of the News, but un-
fortunately our supply of extra copies
of this issue is entirely exhausted.
With the date of the issue, you may
be able to locate a copy in the files or
bound volumes of some subscriber.

Porcelain Panels

No. 1391 (North Dakota)—"I am
promoting a new enterprise which will
require one-piece porcelain metal cabi-
nets similar to present white enamel
refrigerators. Where can I get a list
of companies manufacturing porce-
lain panels?"

Answer—See page 208 of the REFRIG-

ERATION DIRECTORY AND MARKET DATA
Book for a complete list of manufact-
urers of porcelain panels.

Refrigerator Accessories

No. 1392 (Service company, Illinois)
—"We would like to get in touch with
manufacturers of glass defrosting
trays and metal ice cube trays for
electric refrigerators. Can you give us
a list of these so we can write to
them direct?"

Answer—Here is a list of refriger-
ator dish manufacturers:

Bellaire Enamel Co., Bellaire, Ohio
Corning Glass Works, Corning, N. Y.
Federal Enameling & Stamping Co.
Thompson Ave., McKees Rocks, Pa.
Geuder, Paeschke & Fray
324 N. 15th St., Milwaukee, Wis.
Sneath Glass Co., Hartford City, Ind.
United States Stamping Co.
Fostoria Ave., Moundsville, W. Va.
Vollrath Co.
18th & Michigan Ave., Sheboygan, Wis.

For ice cube trays inquire of the
following:

Aluminum Goods Mfg. Co.
Manitowoc, Wis.
Fedders Mfg. Co.
57 Tonawanda St., Buffalo, N. Y.
Hoosier Lamp & Stamping Corp.
1511 Read St., Evansville, Ind.
Inland Mfg. Co.
15 Coleman St., Dayton, Ohio.
Lima Sheet Metal Products Co., Lima, O.
McCord Radiator & Mfg. Co.
2587 E. Grand Blvd., Detroit, Mich.

Recording Thermometers

No. 1393 (Distributor, Pennsylvania)
—"Please advise us where to buy
temperature and time recording clocks
for refrigerator testing."

Answer—All manufacturers of such
devices are listed on page 365 of the
REFRIGERATION DIRECTORY.

Replacement Parts

No. 1394 (Service company, Cali-
fornia)—"Will you send us a list of
companies furnishing replacement
parts?"

Answer—The following companies
specialize in the distribution of re-
placement parts:

Chicago Refrigeration Service Co.
360 E. Grand Ave., Chicago, Ill.
Home Appliance Service Co., Inc.
714 W. Market St., Greensboro, N. C.
Iceless Refrigeration Accessories Co.
2401 Chestnut St., Philadelphia, Pa.
Melchior, Armstrong, Dessau Co.
116 Broad St., New York, N. Y.
Refrigeration Service, Inc.
3109 Beverly Blvd., Los Angeles, Calif.
Refrigerator Parts Co.
2021 S. Michigan Ave., Chicago, Ill.

Export of Electric Refrigerators

July, 1933, Shipments Reported by the Bureau of Foreign
and Domestic Commerce, Washington, D. C.

	Electric Household Refrigerators		Electric Commercial Refrigerators Up to 1 Ton		Parts for Electric Refrigerators	
	Number	Value	Number	Value	Value	
Austria	13	\$ 725			\$ 172	
Belgium	69	6,481	91	6,861	9,097	
Czechoslovakia					694	
Denmark	1	76			124	
Finland	513	31,743	115	10,878	17,590	
France	54	2,880	11	1,495	3,840	
Germany	42	3,805			59	
Greece	8	355	7	908	359	
Irish Free State	112	9,720			1,983	
Italy	2	129			4	
Malta, Goro, and Cyprus	143	9,366	16	1,815	1,464	
Netherlands	38	2,869	19	1,820	1,408	
Norway	1	43	3	355	313	
Poland and Danzig	14	1,414			1,182	
Portugal	68	5,087			2,228	
Rumania	60	3,695	22	1,745	4,391	
Sweden	125	8,838	69	5,462	9,477	
Switzerland	720	47,795	88	8,986	23,403	
United Kingdom					4	
Yugoslavia	695	18,927	46	4,882	24,290	
Canada	2	210				
British Honduras	3	313			58	
Costa Rica	7	487			116	
Guatemala	9	1,133	1	365	6	
Honduras	2	165				
Nicaragua	20	2,002			869	
Panama	2	314			83	
Salvador	141	13,077	2	378	9,309	
Mexico	3	383				
Newfoundland and Labrador	46	3,838	2	400	478	
Bermudas	8	724			43	
Barbados	2	192				
Jamaica	3	325			90	
Trinidad and Tobago	20	1,550				
Other British West Indies	69	4,300	3	363	950	
Cuba	22	1,971			79	
Dominican Republic	10	1,080	9	325	3	
Netherlands West Indies	7	1,115	1	361		
French West Indies	5	389			26	
Haiti, Republic of	190	9,160	71	5,732	8,002	
Argentina	74	7,601	50	3,768	3,248	
Brazil	1	56				
Chile	20	1,419			3	
Colombia	2	336			98	
British Guiana	2	128			16	
Peru	58	4,585			110	
Venezuela	1	96				
Aden	131	8,143	11	1,781	8,039	
British India	19	987	1	133	581	
British Malaya	1	89			16	
Ceylon	80	7,786	10	2,025	465	
China	60	7,095	8	1,450	437	
Netherland East Indies	62	4,887			275	
Hong Kong	11	703	13	1,250	2,833	
Japan	44	3,371	14	1,653	474	
Palestine	47	4,965	28	3,285	1,561	
Philippine Islands	15	1,266				
Syria	30	2,779				
Turkey	105	7,305	2	500		
Australia			1	223	6,846	
British Oceania			1	425	32	
New Zealand	2	160			66	
Union of South Africa	657	58,968	6	1,107	117	
Other British South Africa	3	546			80	
Gold Coast	4	240			154	
Nigeria	6	360				
Egypt	20	1,540	1	122	330	
Algeria and Tunisia	20	1,400	1	229	1,288	
Other French Africa					191	
Italian Africa	6	584				
Morocco	7	871	9	1,336	921	
Mozambique	23	1,857				
Total	4,393	\$326,696	721	\$ 71,918	\$152,881	
Shipments to Hawaii	299	\$ 24,310	25	\$ 3,914	\$ 4,140	
Puerto Rico	30	\$ 4,248	2	\$ 737	\$ 781	

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eration and automotive industries. Capable
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tion division, and sales volume on profit-
able basis. Moderate salary, but respon-
sible connection with sound company
primary consideration. Box 593.

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with service top, work shelf, two drain
tables, sink for hot and cold water, com-
pressor compartment, two refrigerated
compartments for barrel or bottle storage.
Offered subject to prior sale—complete
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eration Corporation, Providence, R. I.

PLANT FOR SALE

FOR SALE—Manufacturing plant located
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production facilities for the manufacture
of electric refrigerator cabinets or other
products. Favorable labor conditions. At
present owned and being operated by an
Estate which is desirous of liquidating.
Inquiries should be directed to Box 590
care of Electric Refrigeration News, 550
Macabees Building, Detroit, Mich.

INDEPENDENT SERVICE COMPANIES

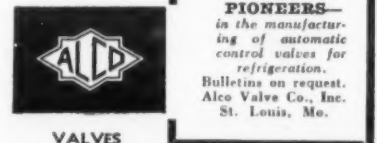
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Ranco, B & B. Two dollars each, one year
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boratory, 1793 Lakeview Road, Cleveland,
Ohio.

MISCELLANEOUS

ANYONE knowing whereabouts of W. R.
Carman, formerly builder at Sarasota, now
reported to be with a New York or New
Orleans Refrigeration Company, please
write J. H. Lord, Jr., Sarasota, Fla.



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